GE Healthcare

Vivid 7

Service Manual

Operating Documentation

Part Number: FC091194
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Important Precautions

WARNING
(EN)

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

AVERTISSEMENT
(FR)

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

WARNUNG
(DE)

- **DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO
(ES)

- ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.
- SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEHC SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.
- NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.
- LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.

ATENÇÃO
(PT)

- ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.
- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.
- O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A‘ CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.

AVVERTENZA
(IT)

- IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.
- SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEHC RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.
- SI PROCEDA ALLA MANUTENZIONE DELL’APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.
- NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL’ADDETTO ALLA MANUTENZIONE, ALL’UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.

HOIATUS
(ET)

- KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.
- KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.
- ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.
- KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.

VAROITUS
(FI)

- TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.
- JOS ASIAKKAAN PALVELUNTARJOAJA VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.
- ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.
- MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA PALVELUNTARJOAJAN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ
(EL)

- ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.
- ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.
- ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.
- ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ ΄Η ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ ΄Η ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.

FIGYELMEZTETÉS
(HU)

- EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.
- HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.
- NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.
- EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.

VIÐVÖRUN
(IS)

- ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.
- EF ÞJÓNUSTUAÐILI VIÐSKIPTAMANNS ÞARFNAST ANNARS TUNGUMÁLS EN ENSKU, ER ÞAÐ Á ÁBYRGÐ VIÐSKIPTAMANNS AÐ ÚTVEGA ÞÝÐINGU.
- REYNIÐ EKKI AÐ ÞJÓNUSTA TÆKIÐ NEMA EFTIR AÐ HAFA SKOÐAÐ OG SKILIÐ ÞESSA ÞJÓNUSTUHANDBÓK.
- EF EKKI ER FARIÐ AÐ ÞESSARI VIÐVÖRUN GETUR ÞAÐ VALDIÐ MEIÐSLUM ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS VEGNA RAFLOSTS, VÉLRÆNNAR EÐA ANNARRAR HÆTTU.

VÝSTRAHA (CS)

- TENTO SERVISNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.
- V PŘÍPADĚ, ŽE POSKYTOVATEL SLUŽEB ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.
- NEPROVÁDĚJTE ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO SERVISNÍ NÁVOD A POCHOPILI JEHO OBSAH.
- V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.

ADVARSEL (DA)

- DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.
- HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.
- FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL ER BLEVET LÆST OG FORSTÅET.
- MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.

WAARSCHUWING (NL)

- DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.
- ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.
- PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.
- INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.

BRĪDINĀJUMS (LV)

- ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.
- JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.
- NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.
- ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.

ĮSPĖJIMAS (LT)

- ŠIS EKSPLOATAVIMO VADOVAS YRA IŠLEISTAS TIK ANGLŲ KALBA.
- JEI KLIENTO PASLAUGŲ TEIKĖJUI REIKIA VADOVO KITA KALBA – NE ANGLŲ, VERTIMU PASIRŪPINTI TURI KLIENTAS.
- NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS DARBŲ, NEBENT VADOVAUTUMĖTĖS ŠIUO EKSPLOATAVIMO VADOVU IR JĮ SUPRASTUMĖTE
- NEPAISANT ŠIO PERSPĖJIMO, PASLAUGŲ TEIKĖJAS, OPERATORIUS AR PACIENTAS GALI BŪTI SUŽEISTAS DĖL ELEKTROS SMŪGIO, MECHANINIŲ AR KITŲ PAVOJŲ.

ADVARSEL (NO)

- DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.
- HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.
- IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.
- MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.

OSTRZEŻENIE (PL)

- NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.
- JEŚLI FIRMA ŚWIADCZĄCA KLIENTOWI USłUGI SERWISOWE WYMAGA UDOSTĘPNIENIA PODRĘCZNIKA W JĘZYKU INNYM NIŻ ANGIELSKI, OBOWIĄZEK ZAPEWNIENIA STOSOWNEGO TłUMACZENIA SPOCZYWA NA KLIENCIE.
- NIE PRÓBOWAĆ SERWISOWAĆ NINIEJSZEGO SPRZĘTU BEZ UPRZEDNIEGO ZAPOZNANIA SIĘ Z PODRĘCZNIKIEM SERWISOWYM.
- NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOżE GROZIĆ OBRAŻENIAMI CIAłA SERWISANTA, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA PRĄDEM, URAZU MECHANICZNEGO LUB INNEGO RODZAJU ZAGROŻEŃ.

ATENȚIE (RO)

- ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.
- DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.
- NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.
- IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.

**ОСТОРОЖНО!
(RU)**

- **ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.**
- **ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.**
- **ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.**
- **НЕСОБЛЮДЕНИЕ УКАЗАННЫХ ТРЕБОВАНИЙ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ТЕХОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЗЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.**

**UPOZORNENIE
(SK)**

- **TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.**
- **AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.**
- **NEPOKÚŠAJTE SA VYKONÁVAŤ SERVIS ZARIADENIA SKÔR, AKO SI NEPREČÍTATE SERVISNÚ PRÍRUČKU A NEPOROZUMIETE JEJ.**
- **ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, PRÍPADNE DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.**

**VARNING
(SV)**

- **DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.**
- **OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.**
- **FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.**
- **OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.**

**DİKKAT
(TR)**

- **BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.**
- **EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.**
- **SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.**
- **BU UYARININ GÖZ ARDI EDİLMESİ, ELEKTRİK ÇARPMASI YA DA MEKANİK VEYA DİĞER TÜRDEN KAZALAR SONUCUNDA TEKNİSYENİN, OPERATÖRÜN YA DA HASTANIN YARALANMASINA YOL AÇABİLİR.**

警告
(JA)

このサービスマニュアルには英語版しかありません。

GEHC 以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。

このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。

この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

注意:
(ZH-CN)

本维修手册仅存有英文本。

非 GEHC 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。

未详细阅读和完全了解本手册之前，不得进行维修。

忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

경고
(KO)

- 본 서비스 지침서는 영어로만 이용하실 수 있습니다.
- 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다.
- 본 서비스 지침서를 참고했고 이해하지 않는 한은 해당 장비를 수리하려고 시도하지 마십시오.
- 이 경고에 유의하지 않으면 전기쇼크, 기계적 혹은 다른 위험으로부터 서비스 제공자, 운영자 혹은 환자에게 위험이 가해질 수 있습니다.

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT - FOR USA ONLY

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Healthcare personnel. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE’s electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE’s field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

OMISSIONS & ERRORS

If there are any omissions, errors or suggestions for improving this documentation, please contact the GE Healthcare Global Documentation Group with specific information listing the system type, manual title, part number, revision number, page number and suggestion details. Mail the information to: Service Documentation, 9900 Innovation Drive (RP-2123), Wauwatosa, WI 53226, USA.

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SERVICE SAFETY CONSIDERATIONS

⚠ DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

⚠ WARNING ***Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.***

For a complete review of all safety requirements, see the Chapter 1, Safety Considerations section in the Service Manual.

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Revision History

REVISION	DATE	REASON FOR CHANGE
01	11. JUN. 2002	Covers both Vivid 7 and Vivid 7 PRO Replaces Vivid 7 Service Manual, Part Number FB091202
02	30. AUG. 2002	Updated per BT02-M4 release. Included description for BEP-2.
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Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing this ultrasound machine. The service provider must read and understand all the information presented here before installing or servicing a unit.

1-1-2 Contents in Chapter 1

Table 1-1 Contents in Chapter 1

SECTION	DESCRIPTION	PAGE NUMBER
1-1	Overview	1-1
1-2	Service Manual Overview	1-2
1-3	Important Conventions	1-9
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1-1-3 Purpose of Service Manual

This Service Manual provides installation and service information for the Vivid 7 Ultrasound Scanning unit.

Section 1-2
Service Manual Overview

The service manual provides installation and service information for the Vivid 7 ultrasound scanning unit. It is divided in 10 chapters as shown below, in Table 1-2 "Contents in this Service Manual" on page 1-2.

1-2-1 Contents in this Service Manual

The service manual is divided in ten chapters.

In the beginning of the manual, before chapter 1, you will find the language policy for GE Healthcare's service documentation, legal information, a revision overview and the Table of Contents (TOC).

An Index has been included after chapter 10.

Table 1-2 Contents in this Service Manual

CHAPTER NUMBER	CHAPTER TITLE	DESCRIPTION
1	Introduction	Contains content summary and warnings
2	**Site Preparations**	Describes the site requirements for the Vivid 7 ultrasound scanner
3	**System Setup**	Contains unpacking and setup procedures
4	**Functional Checks**	Contains: - general (frequently used) procedures - functional checks that must be performed as part of the installation, or as required during servicing and periodic maintenance - diagnostics
5	**Components and Functions (Theory)**	Contains block diagrams and functional explanations of the electronics
6	**Service Adjustments**	Contains instructions on how to make any available adjustments to the Vivid 7
7	**Diagnostics/Troubleshooting**	Provides procedures for running and diagnostic or related routines for the Vivid 7
8	**Replacement Procedures**	Provides disassembly procedures and reassembly procedures for all changeable FRU
9	**Renewal Parts**	Contains a complete list of replacement parts for Vivid 7
10	**Care & Maintenance**	Provides periodic maintenance procedures for Vivid 7
N/A	Index	A quick way to the topic you're looking for

1-2-2 Typical Users of the Service Manual

- Service Personnel (installation, maintenance, etc.)
- Hospital's Service Personnel
- Architectural Planners/Installation Planners (some parts of Chapter 2, Site Preparations)

1-2-3 Vivid 7 Models Covered by this Manual

Table 1-3 Vivid 7 Models and Hardware/Software Compatibility sheet 1 of 3

MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FD000010	VIVID 7 DIMENSION CONSOLE, LCD MONITOR, 230 VAC	FEP2 (RFI)	BEP4.2	v7.0
FD000020	VIVID 7 DIMENSION CONSOLE, LCD MONITOR, 100-120 VAC			
FD000120	VIVID 7 PRO CONSOLE, LCD MONITOR, 230 VAC			
FD000130	VIVID 7 PRO CONSOLE, LCD MONITOR, 100-120 VAC			
FD000140	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR, 230 VAC			
FD000150	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR, 100-120 VAC			
FD000160	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR, 230 VAC			
FD000170	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR, 100-120 VAC			
FD000180	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR, 230 VAC			
FD000190	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR,100-120 VAC			
FC000890	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 230 VAC	FEP2 (RFI)	BEP4.2	v6.x
FC000900	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 120 VAC			
FC000910	VIVID 7 DIMENSION (BT'06) 230 VAC			
FC000920	VIVID 7 DIMENSION (BT'06) 100-120 VAC			
FC000930	VIVID 7 PRO (BT'06) 230 VAC			
FC000940	VIVID 7 PRO (BT'06) 100-120 VAC			
FC000950	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 230 VAC			
FC000960	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 120 VAC			
FC000970	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 230 VAC			
FC000980	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 120 VAC			

Table 1-3 Vivid 7 Models and Hardware/Software Compatibility (cont'd) sheet 2 of 3

MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FC000760	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME (BT'05), 230 VAC	FEP2 (RFI)	BEP3.2	v5.x
FC000770	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME (BT'05), 120 VAC			
FC000780	VIVID 7 DIMENSION (BT'05), 230 VAC			
FC000790	VIVID 7 DIMENSION (BT'05), 100-120 VAC			
FC000800	VIVID 7 PRO (BT'05), 230 VAC			
FC000810	VIVID 7 PRO (BT'05), 100-120 VAC			
FC000820	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'05), 230 VAC			
FC000830	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'05), 120 VAC			
FC000840	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05), 230 VAC			
FC000850	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05), 100-120 VAC			
FC000699	VIVID 7 (BT'04), 100-120 VAC	FEP2 (RFI)	BEP3	v4.x
FC000660	VIVID 7 PRO (BT'04), 100-120 VAC			
FC000650	VIVID 7 PRO (BT'04), 230 VAC			
FC000640	VIVID 7 DIMENSION (BT'04), 100-120 VAC			
FC000630	VIVID 7 DIMENSION (BT'04), 230 VAC			
FC000620	VIVID 7 DIMENSION WITH 3D (BT'04), 100-120 VAC			
FC000610	VIVID 7 DIMENSION WITH 3D (BT'04), 230 VAC			
FC000440	VIVID 7 PRO with RFI, 100-120 VAC		BEP2.2	v3.2/v3.4
FC000430	VIVID 7 PRO with RFI, 230 VAC			
FC000420	VIVID 7 with RFI, 100-120 VAC			
FC000410	VIVID 7 with RFI, 230 VAC			

Table 1-3 Vivid 7 Models and Hardware/Software Compatibility (cont'd) sheet 3 of 3

MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FC000340	VIVID 7 PRO (BT'03), 100 - 120 VAC	FEP1 (RFT)	BEP2	v3.1/v3.3
FC000330	VIVID 7 PRO (BT'03), 220 - 240 VAC			
FC000320	VIVID 7 (BT'03), 100 - 120 VAC			
FC000310	VIVID 7 (BT'03), 220 - 240 VAC			
FC000210	VIVID 7 (BT'02), 100 - 120 VAC		- Manufactured with either BEP1 or BEP2. - BEP2 may be used as FRU - BEP2 phased into production from September 2002.	v2.3/v2.4
FC000200	VIVID 7 (BT'02), 220 - 240 VAC			
FC000190	VIVID 7 PRO (BT'02), 100 - 120 VAC			
FC000180	VIVID 7 PRO (BT'02), 220 - 240 VAC			
FC000060	VIVID 7 (BT'01), 100 - 120 VAC		- Manufactured with BEP1 - BEP2 may be used as FRU	
FC000030	VIVID 7 (BT'01), 230 VAC			

NOTE: When not otherwise specified, the contents in this manual applies to all Vivid 7 models.

1-2-4 Product Description

1-2-4-1 Overview of the Vivid 7 Ultrasound Scanner

- Vivid 7 is a phased and linear array ultrasound imaging scanner. It also has provisions for analog input sources like ECG and phono, and a Doppler probe may be connected and used too.
- Real Time 3D (RT 3D) was introduced as an option to VIVID 7 Dimension in 2004 (BT'04).
- The unit can be used for:
    - 2D Black and White imaging
    - 2D Color Flow
    - M-Mode Black and White imaging
    - Color M-Mode
    - Doppler
    - a number of combinations of the above
    - Real Time 3D measurements (4D)
- Vivid 7 is a digital beam forming unit and can handle up to 192 element linear probes by use of multiplexing.
- Signal flow from the Probe Connector Panel to the Front-End, then to the Mid Processors and Back-End Processor and finally to the monitor and peripherals.
- System configuration is stored on a hard disk drive (HDD) and all necessary software is loaded from the HDD on power up.

1-2-4-1 Overview of the Vivid 7 Ultrasound Scanner (cont'd)

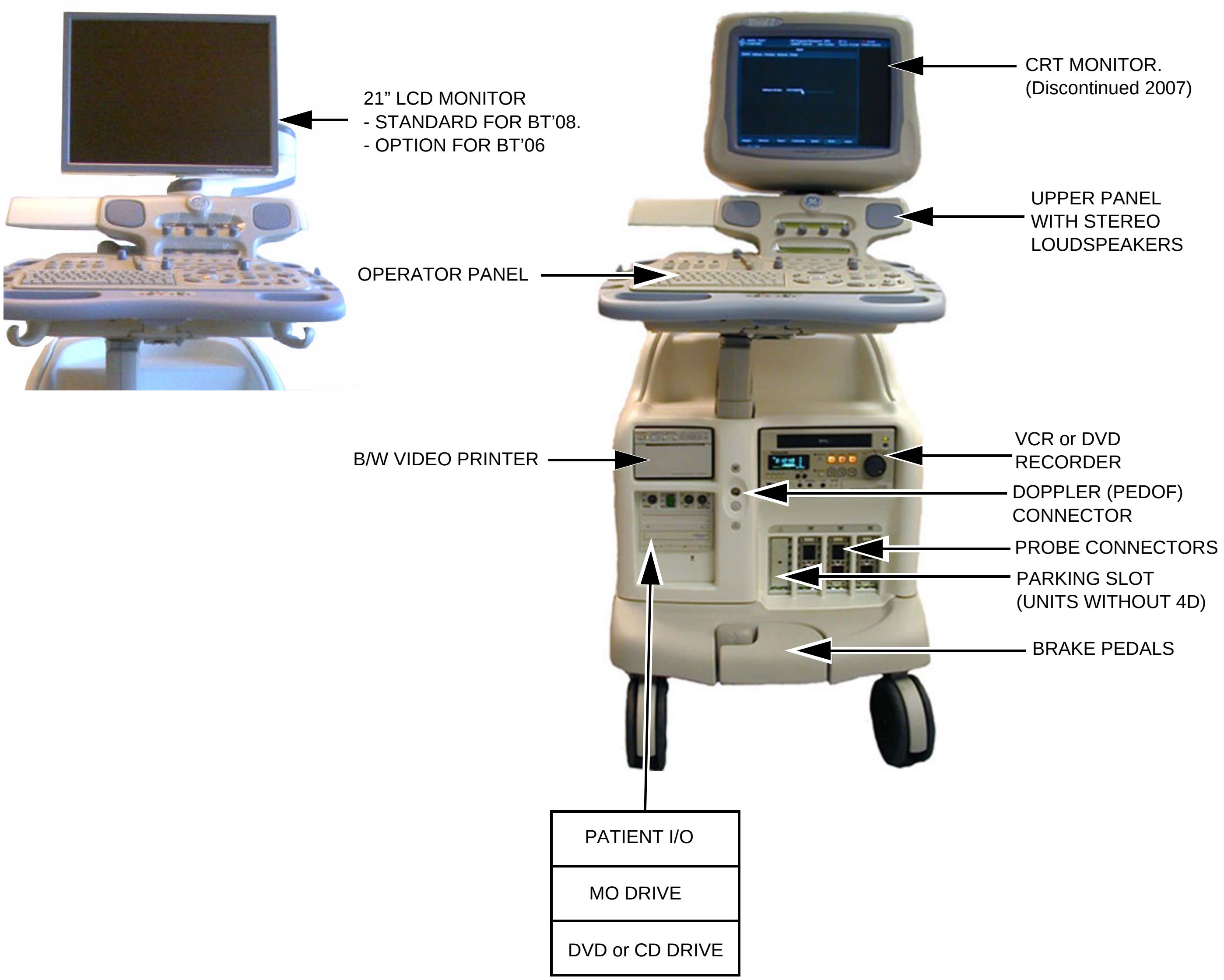

21" LCD MONITOR
- STANDARD FOR BT'08.
- OPTION FOR BT'06
CRT MONITOR.
(Discontinued 2007)
UPPER PANEL
WITH STEREO
LOUDSPEAKERS
OPERATOR PANEL
B/W VIDEO PRINTER
VCR or DVD
RECORDER
DOPPLER (PEDOF)
CONNECTOR
PROBE CONNECTORS
PARKING SLOT
(UNITS WITHOUT 4D)
BRAKE PEDALS
PATIENT I/O
MO DRIVE
DVD or CD DRIVE

Figure 1-1 Vivid 7 Major Components

1-2-4-2 History - Hardware/Software Versions

The contents in this sub-section has been moved to chapter 9.

- For Front-End Processor Version 2, please refer to: 9-18-2 "Hardware/Software Versions, Front-End Processor Version 2 (FEP2)" on page 9-38
- For Front-End Processor Version 1, please refer to: 9-18-4 "Hardware/Software Versions, Front-End Processor Version 1" on page 9-42

1-2-4-3 History - Peripherals/Software Versions

The contents in this sub-section has been moved to chapter 9.

Please refer to:

- 9-22-1 "Peripherals Compatibility" on page 9-63

1-2-4-4 FRUs for Back-End Processor

The contents in this sub-section has been moved to chapter 9.

Please refer to:

- Section 9-19 "Back-End Processor" on page 9-46

1-2-4-5 History - Supported Probes

The contents in this sub-section has been moved to chapter 9.

Please refer to:

- Section 9-26 "Probes" on page 9-80

1-2-4-6 How to Turn the Scanner ON and OFF

Please refer to *Chapter 4*, section 4-2-2 - Power ON/ Boot UP, for a detailed description of how to turn the scanner ON and to *Chapter 4*, section 4-2-3 - Power Shut Down for a detailed description of how to turn the scanner OFF.

1-2-4-7 How to Check for Hardware/Software Version, Installed Options

To verify the hardware versions on the boards, please refer to the appropriate table:

- "Hardware/Software Versions, Front-End Processor Version 2 (FEP2)" on page 9-38
- "Hardware/Software Versions, Front-End Processor Version 1" on page 9-42

Please refer to "Software Configuration Checks" on page 4-82 to check the software versions on local software on the boards.

Please refer to "Functional Checks" on page 4-28 to check for installed options.

1-2-4-8 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the Vivid 7 and also kept near the unit for quick reference.

Section 1-3
Important Conventions

1-3-1 Conventions Used in Book

1-3-1-1 Model Designations.

This manual covers the Vivid 7 scanners listed in Table 1-3 on page 1-3.

1-3-1-2 Icons

Pictures, or icons, are used wherever they will reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

1-3-1-3 Safety Precaution Messages

Various levels of safety precaution messages may be found on the equipment and in the service information. The different levels of concern are identified by a flag word that precedes the precautionary message. Known or potential hazards to personal are labeled in one of the following ways:

⚠ **DANGER** **Danger is used to indicate the presence of a hazard that will cause severe personal injury or death if the instructions are ignored.**

⚠ **WARNING** ***Warning is used to indicate the presence of a hazard that can cause severe personal injury and property damage if instructions are ignored.***

⚠ **CAUTION** **Caution is used to indicate the presence of a hazard that will or can cause minor personal injury and property damage if instructions are ignored.**

⚠ **NOTICE** **Equipment Damage Possible.**

Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk.

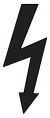
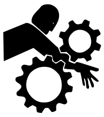
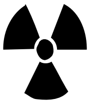
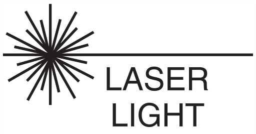
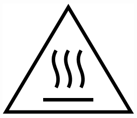
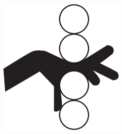
Example: Disk drive will crash.

NOTE: *Notes provide important information about an item or a procedure.*
Information contained in a NOTE can often save you time or effort.

1-3-2 Standard Hazard Icons

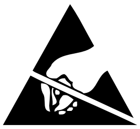
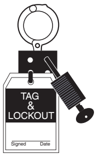
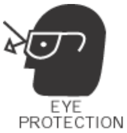
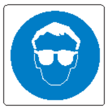
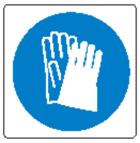
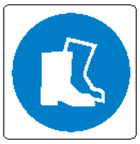
Important information will always be preceded by the exclamation point ⚠ contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could possibly cause harm. Even if a symbol isn't used in this manual, it is included for your reference.

Table 1-4 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
		
LASER	**HEAT**	**PINCH**
		

Some others make you aware of specific procedures that should be followed.

Table 1-5 Standard Icons that indicates that a special procedure is to be used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION
		 OR 
HAND PROTECTION	**FOOT PROTECTION**	
		

1-3-3 Product Icons

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 1-6 Product Icons sheet 1 of 4

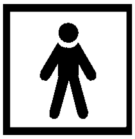
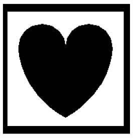
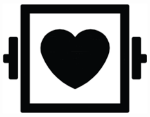
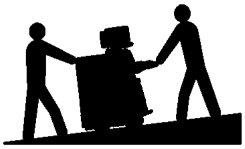
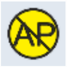
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Identification and Rating Plate	Manufacturer's name and address Date of manufacture Model and serial numbers Electrical ratings	Rear of console near power inlet
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8/IP68)	Indicates the degree of protection provided by the enclosure per IEC 529. IPX8 indicates drip proof and may be used in an Operating Theater. The footswitch delivered with Vivid 7 is IP68 rated.	Footswitch
	Equipment Type BF (man in the box symbol) IEC 878-02-03 indicates B Type equipment having a floating applied part.	Probe connectors including Doppler probe connector
	Equipment Type CF (heart in the box symbol) IEC 878-02-05 indicates equipment having a floating applied part having a degree of protection suitable for direct cardiac contact.	Probe connectors and ECG connector. On newer systems also on the rear of the system.
	DEFIBRILLATOR-PROOF TYPE CF EQUIPMENT.	At the ECG connector on front of system.
Device Listing/Certification Labels	Laboratory logo or labels denoting conformance with industry safety standards such as UL or IEC.	Rear of console
“CAUTION - This unit weighs...Special care must be used to avoid...” 	This precaution is intended to prevent injury that may result if one person attempt to move the unit considerable distances or on an incline due to the weight of the unit.	On the console where easily seen during transport
“DANGER - Risk of explosion used in...”	The system is not designed for use with flammable anesthetic gases.	Rear of console
	The system is not designed for use with flammable anesthetic gases.	Rear of console

Table 1-6 Product Icons (cont'd) sheet 2 of 4

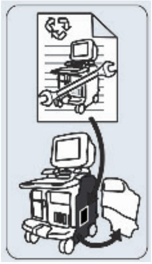
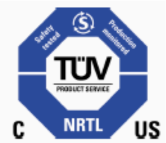
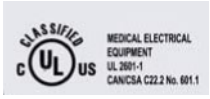
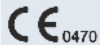
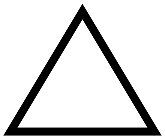
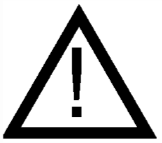
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	Please refer to the Recycling instructions on the label located outside the Front End Card Rack's Cover (Inside the unit), see Figure 1-20 on page 1-64 and Figure 1-23 on page 1-67.	REAR OF CONSOLE
Vivid 7 SCANNERS PRODUCED AFTER SEPTEMBER 2004:  Safety tested Production monitored TÜV PRODUCT SERVICE NRTL C US	**Vivid 7 SCANNERS PRODUCED AFTER SEPTEMBER 2004:** "TESTED AND PRODUCTION MONITORED BY TUV PRODUCT SERVICE NRTL WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL2601-1 AND CAN/CSA C22.2 NO.601.1" Products produced before September 2004 will bear the c-UL-us Classification mark, shown below.	REAR OF CONSOLE ON Vivid 7 PRODUCED AFTER SEPTEMBER 2004
Vivid 7 SCANNERS PRODUCED BEFORE SEPTEMBER 2004:  CLASSIFIED c UL us MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1	**Vivid 7 SCANNERS PRODUCED BEFORE SEPTEMBER 2004:** "CLASSIFIED BY UNDERWRITERS LABORATARIES INC WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL2601-1 AND CAN/CSA C22.2 NO.601.1"	REAR OF CONSOLE ON Vivid 7 PRODUCED BEFORE SEPTEMBER 2004
	This unit carries the CE mark. The Vivid 7 unit complies with regulatory requirements of the European Directive 93/ 42/EEC concerning medical devices. It also complies with emission limits for a Group 1, Class B Medical Device as stated in EN 60601-1-2 (IEC 60601-1-2). (Units produced before 2 May 2002 have the CE0301 label.)	REAR OF CONSOLE
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various
	"ATTENTION - Consult accompanying documents" is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	Various

Table 1-6 Product Icons (cont'd) sheet 3 of 4

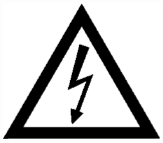
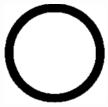
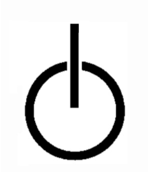
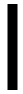
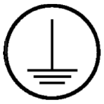
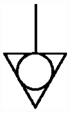
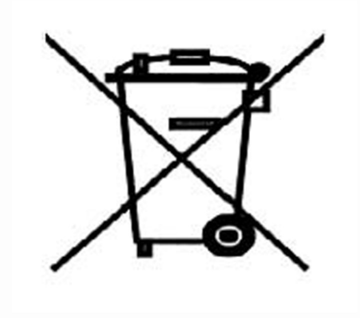
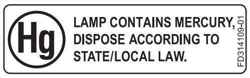
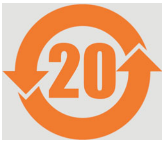
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various
	"Mains OFF" Indicates the power off position of the mains power switch.	Rear of system adjacent to mains switch
	"OFF/Standby" Indicates the power off/ standby position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Mains Supply**	Adjacent to On/Off (Standby) Switch
	"Mains ON" Indicates the Power ON position of the mains power switch. "ON" Indicates the power on position of the power switch. **CAUTION** **The Power Switch on the Operator Panel DOES NOT ISOLATE Mains Supply**	
	"Protective Earth" Indicates the protective earth (grounding) terminal.	Used several places inside the scanner.
	**"Equipotential"** Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment as described in IEC60601-1.	Rear of console
	This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	Rear Panel
 Hg LAMP CONTAINS MERCURY, DISPOSE ACCORDING TO STATE/LOCAL LAW. FD314109-01	This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor display contain mercury.)	Rear of the LCD monitor (USA only)

Table 1-6 Product Icons (cont'd) sheet 4 of 4

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	**The following product pollution control information is provided according to SJ/T11364-2006 Marking for Control of Pollution caused by Electronic Information Products.** This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year". In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly. Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures. This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.	Rear Panel (China)

Section 1-4
Safety Considerations

1-4-1 Overview

Table 1-7 Contents in Section 1-4 - Safety Considerations

SUB-SECTION	DESCRIPTION	PAGE NUMBER
1-4-1	Overview	1-15
1-4-2	Introduction	1-15
1-4-3	Human Safety	1-16
1-4-4	Mechanical Safety	1-17
1-4-5	Electrical Safety	1-19

1-4-2 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-4-3 Human Safety

⚠ DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

⚠ WARNING ***WHEN THE TOP CONSOLE IS IN ITS LOCKED POSITION, THE GAS SPRING IS COMPRESSED AND STORES MECHANICAL ENERGY. DURING NORMAL OPERATION THE TOP CONSOLE, THE WEIGHT OF THE MONITOR AND THE MECHANICAL FORCE OF THE GAS SPRING ARE IN BALANCE. TAKE CARE IF/WHEN YOU ACTIVATE THIS GAS SPRING. PERSONAL INJURY CAN OCCUR AFTER THE PANEL IS REMOVED AND THE SPRING PRESSURE IS RELEASED. TAKE CARE WHEN YOU REPAIR THE ELEVATION ASSEMBLY.***

⚠ WARNING ***TWO PEOPLE SHOULD UNPACK THE UNIT BECAUSE OF ITS WEIGHT. TWO PEOPLE ARE REQUIRED WHENEVER A PART WEIGHING 16 KG (35 LBS) OR MORE MUST BE LIFTED.***

⚠ WARNING ***USE ALL PERSONAL PROTECTING EQUIPMENT (PPE) SUCH AS GLOVES, SAFETY SHOES, SAFETY GLASSES, AND KNEELING PAD, TO REDUCE THE RISK OF INJURY.***

⚠ WARNING ***BEWARE OF POSSIBLE SHARP EDGES ON ALL MECHANICAL PARTS. IF SHARP EDGES ARE ENCOUNTERED, THE APPROPRIATE PPE SHOULD BE USED TO REDUCE THE RISK OF INJURY.***

⚠ WARNING ***WEAR ALL PPE INCLUDING GLOVES AS INDICATED IN THE CHEMICAL MATERIAL SAFETY DATA SHEET (MSDS) OR PRODUCT DATA SHEET.***

⚠ WARNING ***ENSURE THAT THE SYSTEM IS TURNED OFF AND UNPLUGGED. TO VERIFY THAT THE FRONT END POWER SUPPLY (FEPS) IS IN A ZERO ENERGY STATE, WAIT AT LEAST 20 SECONDS FOR THE CHARGE ON THE FEP'S OUTPUTS TO BLEED OFF.***

⚠ WARNING ***WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.***

⚠ WARNING ***TILTING THE CONSOLE REQUIRES TWO PEOPLE IN ORDER TO AVOID INJURY TO SERVICE PERSONNEL AND DAMAGE TO THE EQUIPMENT.***

Operating personnel must not remove the system covers.

Servicing should be performed by authorized personnel only.

Only personnel who have participated in a Vivid 7 Training are authorized to service the equipment.

1-4-4 Mechanical Safety

⚠ WARNING *PRIOR TO ELEVATING SCANNER, VERIFY THAT THE KEYBOARD IS LOCKED IN ITS LOWEST POSITION. VERIFY THAT THE FRONT BRAKE IS LOCKED AND THE SCANNER IS UNABLE TO SWIWEL. VERIFY THAT THE REAR BRAKES ARE IN THE LOCKED POSITION.*

⚠ WARNING *WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.*

⚠ WARNING *ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.*

⚠ WARNING *NEVER USE A PROBE THAT HAS FALLEN TO THE FLOOR. EVEN IF IT LOOKS OK, IT MAY BE DAMAGED.*

⚠ WARNING *REMEMBER: IF THE FRONT CASTER SWIVEL LOCK IS ENGAGED FOR TRANSPORTATION, PRESSING THE RELEASE PEDAL ONCE DISENGAGES THE SWIVEL LOCK. YOU MUST DEPRESS THE RELEASE PEDAL A SECOND TIME TO ENGAGE THE BRAKE.*

⚠ WARNING *THE SYSTEM SHOULD NOT BE MOVED WITH THE OPERATOR PANEL EXTENDED. MOVE THE OPERATOR PANEL TO ITS CENTERED AND LOCKED POSITION. LOWER THE OPERATOR PANEL AS MUCH AS POSSIBLE BEFORE MOVING THE SYSTEM.*

⚠ CAUTION **Ensure that nobody touch the console arm/frogleg when moving the Operator Panel (Control Console).**

⚠ CAUTION **Do not move the unit if the Operator Panel (Control Console) is in unlocked position.**

⚠ CAUTION **Always lock the Operator Panel (Control Console) in its parking (locked) position before moving the scanner around.**

⚠ CAUTION **Keep the heat venting holes on the monitor unobstructed to avoid overheating of the monitor.**

⚠ CAUTION **VIVID 7 weighs 190 kg (419 lbs) or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed below could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

- **Be sure the pathway is clear.**
- **Use slow, careful motions.**
- **Use two people when moving on inclines or lifting more than 16 kg (35 lbs).**

⚠ CAUTION **To avoid injury when you move the LCD monitor and the monitor arm, do NOT put your finger, hand, or object on the joint of the monitor and the monitor arm.**

1-4-4 Mechanical Safety (cont'd)

CAUTION **Before you move or transport the system, make sure to lock the LCD monitor firmly and flip down the monitor to prevent damage to the system.**

CAUTION **To avoid injury or damage to the monitor, make sure there is nothing within range of the LCD before moving the monitor and the monitor arm. This includes people as well as things.**

CAUTION **Do not transport Vivid 7 in a vehicle without locking the casters (wheels).**

CAUTION **Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.**

CAUTION **Use Protective Glasses during Drilling, Filing and during all other work where eyes need protection.**

CAUTION **Use Safety Shoes when doing work where there is any chance of foot damage.**

CAUTION **Use Protective Gloves when drilling and cutting.**

NOTE: *Special care should be taken when transporting the unit in a vehicle:*

- Lock Operator Panel (Control Console) in place.
- Eject any Magneto Optical disk, CD or DVD from their drive.
- Secure the unit in an upright position.
- Lock the casters (wheels) (brake)
- DO NOT use the Operator Panel (Control Console) as an anchor point.
- Place the probes in their carrying case.

1-4-5 Electrical Safety

1-4-5-1 Safe Practices

Follow these guidelines to minimize shock hazards whenever you are using the scanner;

- The equipment chassis must be connected to an electrical ground.
- The unit is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground.
- The power outlet used for this equipment should not be shared with other types of equipment.
- Both the system power cable and the power connector must meet international electrical standards.

WARNING ***CONNECTING A Vivid 7 SCANNER TO THE WRONG VOLTAGE LEVEL WILL MOST LIKELY DESTROY IT.***

1-4-5-2 Probes

Follow these guidelines before connecting a probe to the scanner;

- Inspect the probe prior to each use for damage or degradation to the;
  - housing
  - cable strain relief
  - lens
  - seal
- Do not use a damaged or defective probe.
- Never immerse the probe connector or adapter into any liquid.

Section 1-5
Labels Locations

1-5-1 Labels on Front of Monitor and Operator Panel

Table 1-8 Labels on Front of Monitor and Operator Panel

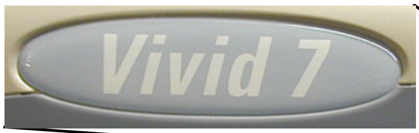
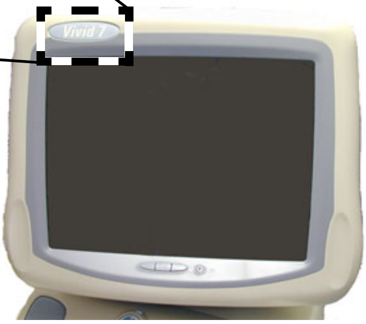
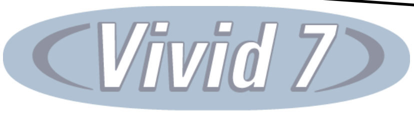
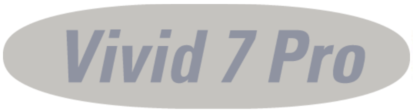
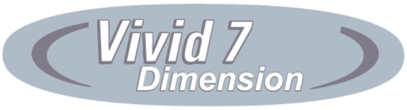
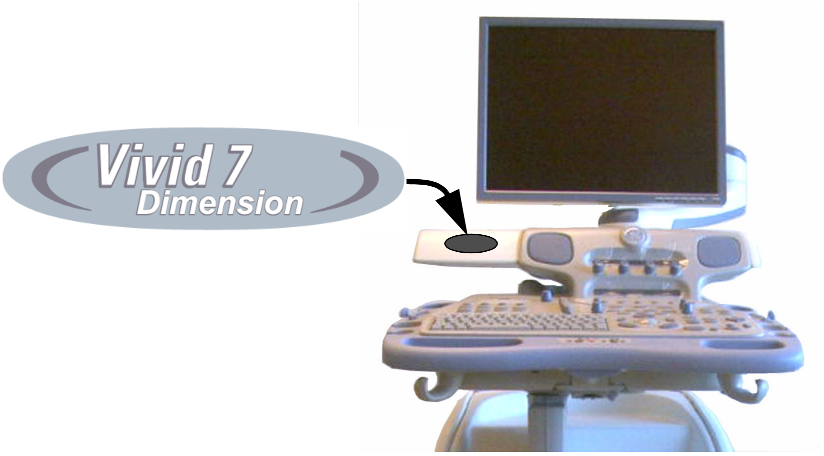
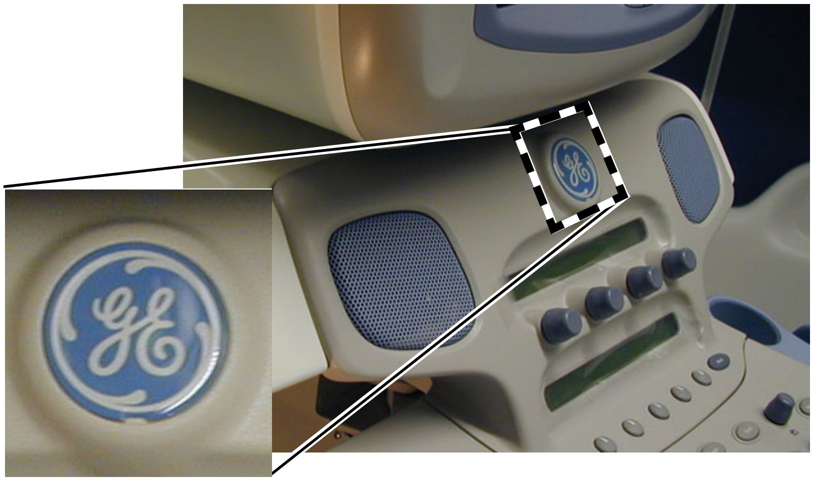
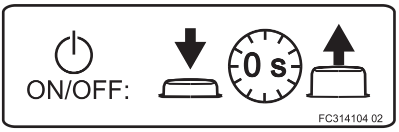
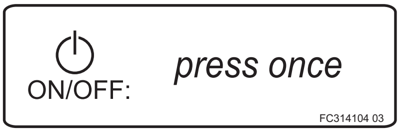
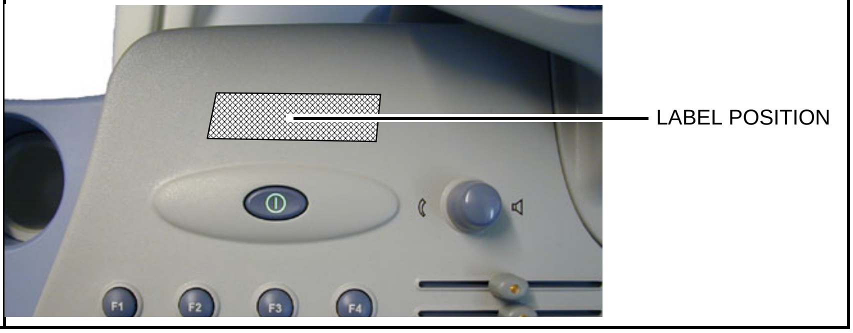
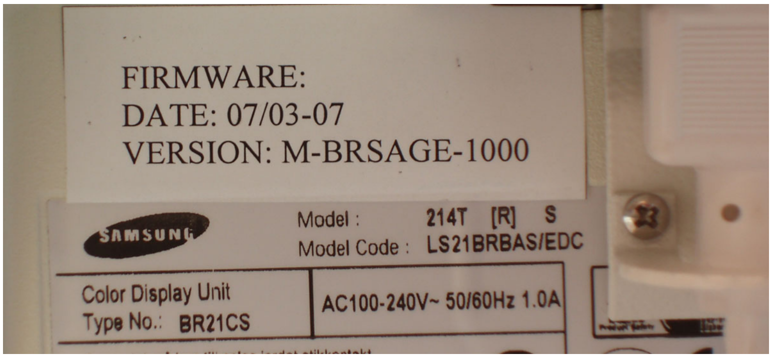
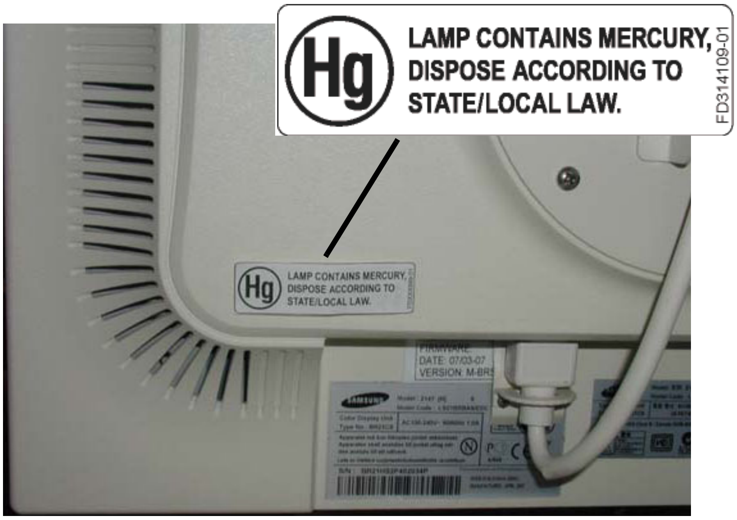
DESCRIPTION	ILLUSTRATION
Label, Vivid 7 (Monitor) (Introduced in 2001)	 
Label, Vivid 7 (Monitor) (Introduced in 2002)	
Label, Vivid 7 PRO (Monitor) (Introduced in 2002)	
Label, Vivid 7 Dimension (Monitor) (Introduced 2004)	 Vivid 7 Dimension
For Vivid 7 Dimension with LCD screen (option since 2006)	 Vivid 7 Dimension

Table 1-8 Labels on Front of Monitor and Operator Panel (cont'd)

DESCRIPTION	ILLUSTRATION
Label, GE Logo	
Label, On/Off Switch (Two versions of the label have been used, the one to the right is the latest version.)	 ON/OFF: 0 s FC314104 02 OR  ON/OFF: press once FC314104 03  LABEL POSITION F1 F2 F3 F4

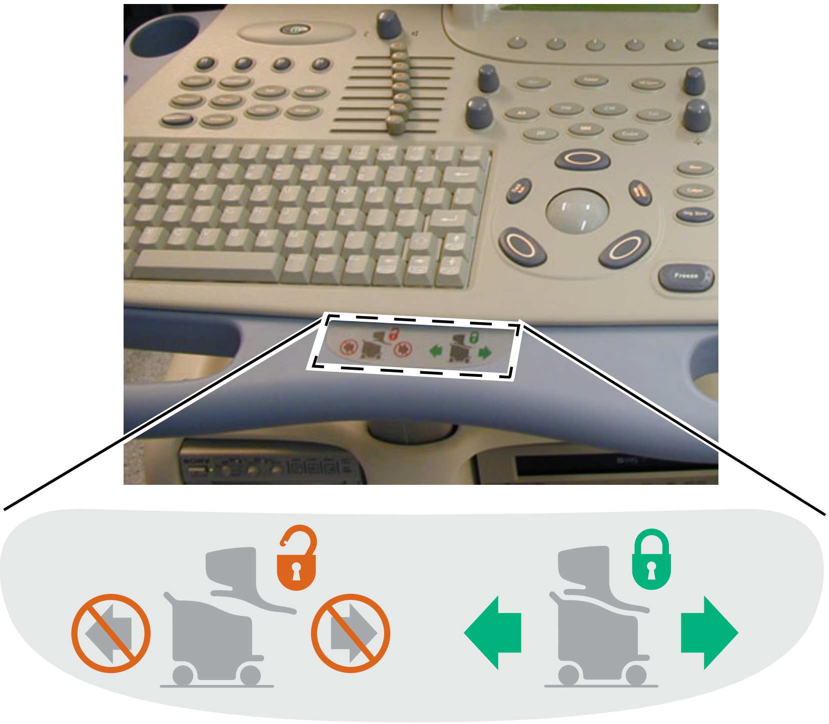
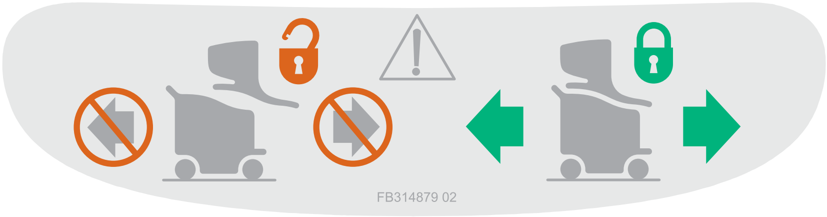
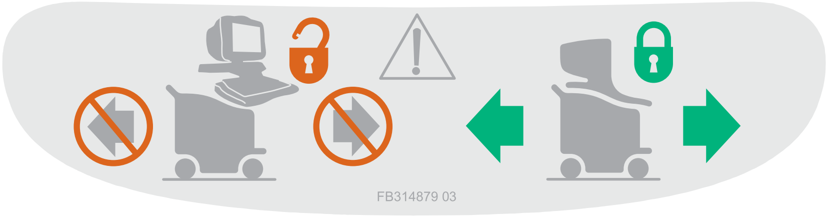
1-5-2 Labels on Rear of LCD Monitor

Table 1-9 Label on Rear of LCD Monitor

DESCRIPTION	ILLUSTRATION
Firmware label LCD monitor	 FIRMWARE: DATE: 07/03-07 VERSION: M-BRSAGE-1000 SAMSUNG Model : 214T [R] S Model Code : LS21BRBAS/EDC Color Display Unit Type No.: BR21CS AC100-240V~ 50/60Hz 1.0A
FOR USA ONLY: LCD MONITOR MERCURY HG. Introduced October 1, 2007	 Hg LAMP CONTAINS MERCURY, DISPOSE ACCORDING TO STATE/LOCAL LAW. FD314109-01

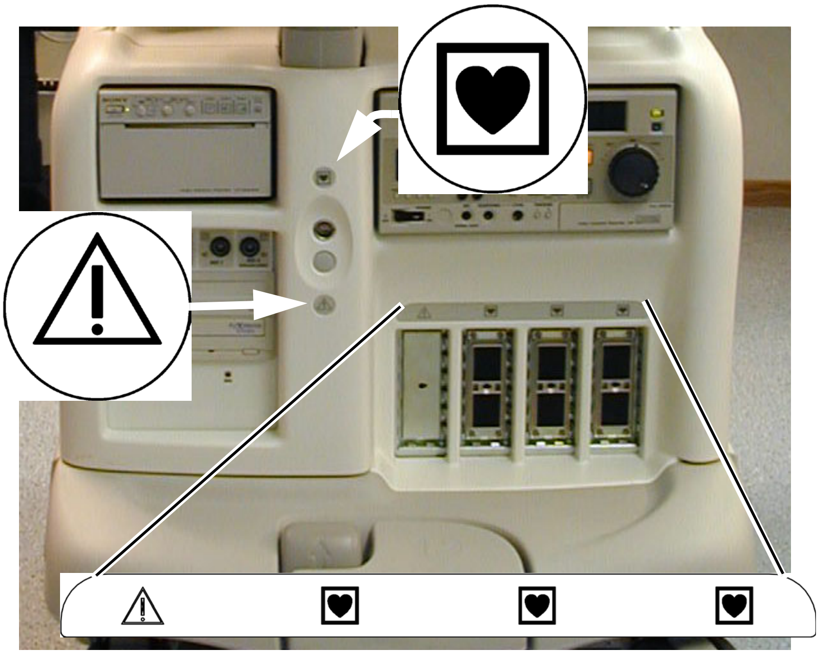
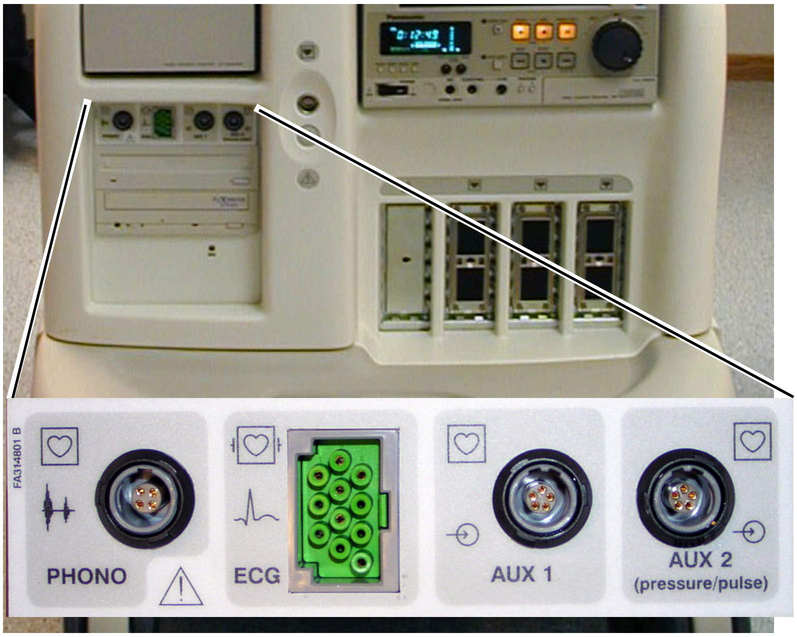
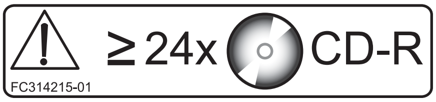
1-5-3 Labels on Front Handle

Table 1-10 Labels on Front Handle

DESCRIPTION	ILLUSTRATION
Label, Front Handle Three versions of the label have been used. The lower one is the latest version.	 OR  OR 

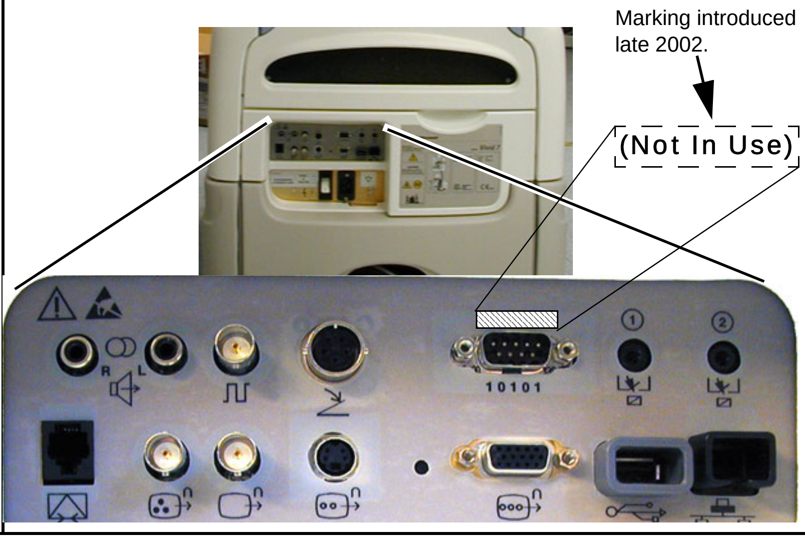
1-5-4 Labels Near Connectors on Front

Table 1-11 Labels Near Connectors on Front

Description	Illustration
Label, Probe Connector (The Label, “Probe Connector” consists of three labels, named; - “Main Label Part”, - “Heart Symbol” and - “See Manual symbol”.)	
Label, Patient I/O Module II	 FA314801 B PHONO ECG AUX 1 AUX 2 (pressure/pulse)
BEP1 ONLY: Label CD ROM (introduced April 2002)	 ≥24x CD-R FC314215-01

1-5-5 Label on External I/O

Table 1-12 Label, External I/O

DESCRIPTION	ILLUSTRATION
Label, External. I/O	 Marking introduced late 2002. (Not In Use)

1-5-6 Labels at AC Mains Inlet and Circuit Breaker

Table 1-13 Labels at AC Mains Inlet and Circuit Breaker (used before May 2002)

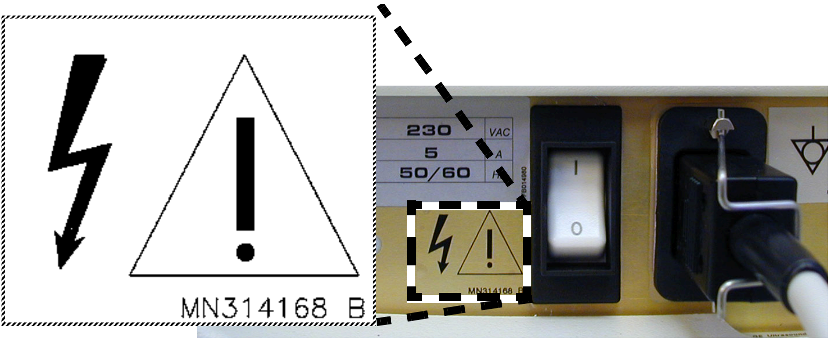
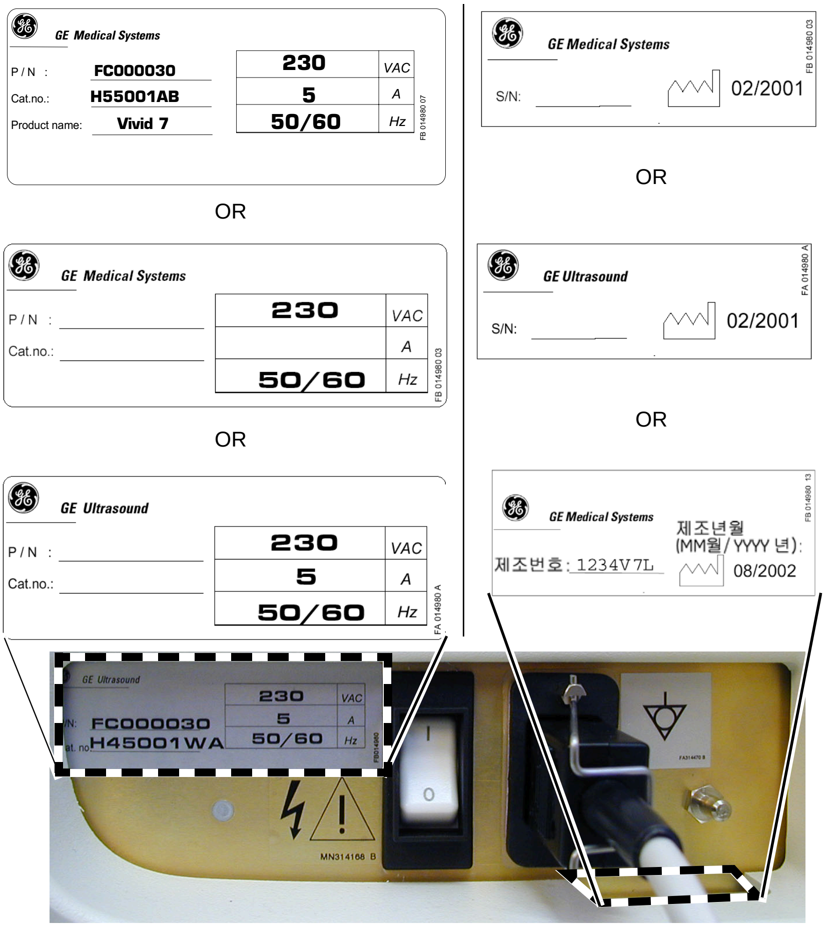
DESCRIPTION	ILLUSTRATION
Label, Warning	 MN314168 B 230 5 50/60 VAC A
Label, System: P/N, Power rating	 GE Medical Systems P/N : FC000030 Cat.no.: H55001AB Product name: Vivid 7 230 VAC 5 A 50/60 Hz FB 014980 07 OR GE Medical Systems P/N : Cat.no.: 230 VAC A 50/60 Hz FB 014980 03 OR GE Ultrasound P/N : Cat.no.: 230 VAC 5 A 50/60 Hz FA 014980 A GE Medical Systems S/N: 02/2001 FB 014960 03 OR GE Ultrasound S/N: 02/2001 FA 014980 A OR GE Medical Systems 제조년월 (MM월/YYYY 년): 제조번호: 1234V7L 08/2002 FB 014980 13 GE Ultrasound FC000030 H45001WA 230 VAC 5 A 50/60 Hz MN314168 B
Label, System: S/N Since the introduction of the Vivid 7, the Serial Number have been changed a few times: - On the first systems (with RFT), the serial number were a 4 digit serial number. Example: 1234 In the GIB database, a “VM” suffix were added for these serial numbers, to make them unique. Example: 1234VM - Starting with the introduction of the RFI systems FC200410, FC200420, FC200430 and FC200440, from serial number 3276V7 and onwards, the product code “V7” was added as a suffix on the label. In the GIB database, this product code replaces the “VM” suffix. Example: 3276V7 (both on the label and in the GIB database) When the LCD monitor was introduced, a new suffix was added to the serial number on the label. A “C” indicates that the system has a CRT monitor, an “L” indicates that the system has an LCD monitor. Example: 9876V7C indicates that the unit has a CRT monitor Example: 9876V7L indicates that the unit has an LCD monitor.	

Table 1-13 Labels at AC Mains Inlet and Circuit Breaker (used before May 2002) (cont'd)

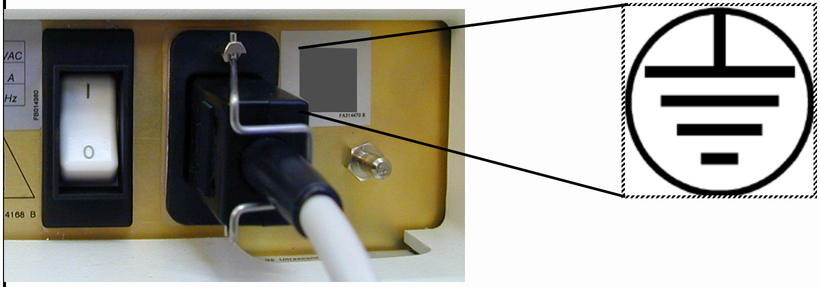
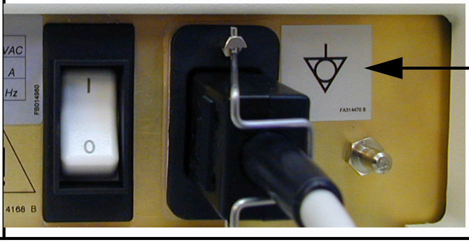
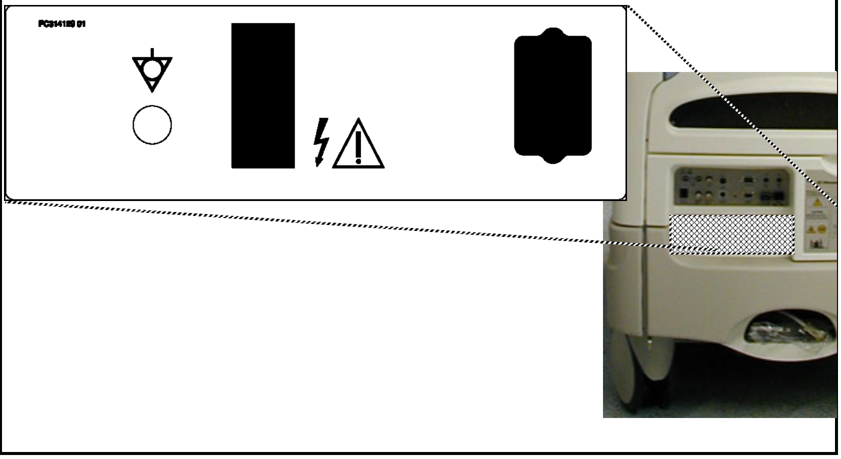
DESCRIPTION	ILLUSTRATION
Label, GND-symbol	Ground (GND) Label. (Used on 230 VAC Systems and some 100-120 VAC Systems.) 
Label, GND-symbol., Hospital Grade	 Hospital Grade Ground (GND) Label. (Used on some 100-120 VAC Systems)

Table 1-14 Labels at AC Mains Inlet and Circuit Breaker (used after May 2002)

DESCRIPTION	ILLUSTRATION
Label, AC Controller	

1-5-7 Label on Rear Cover - Vivid 7 Dimension

Table 1-15 Label on Rear Cover - Vivid 7 Dimension sheet 1 of 2

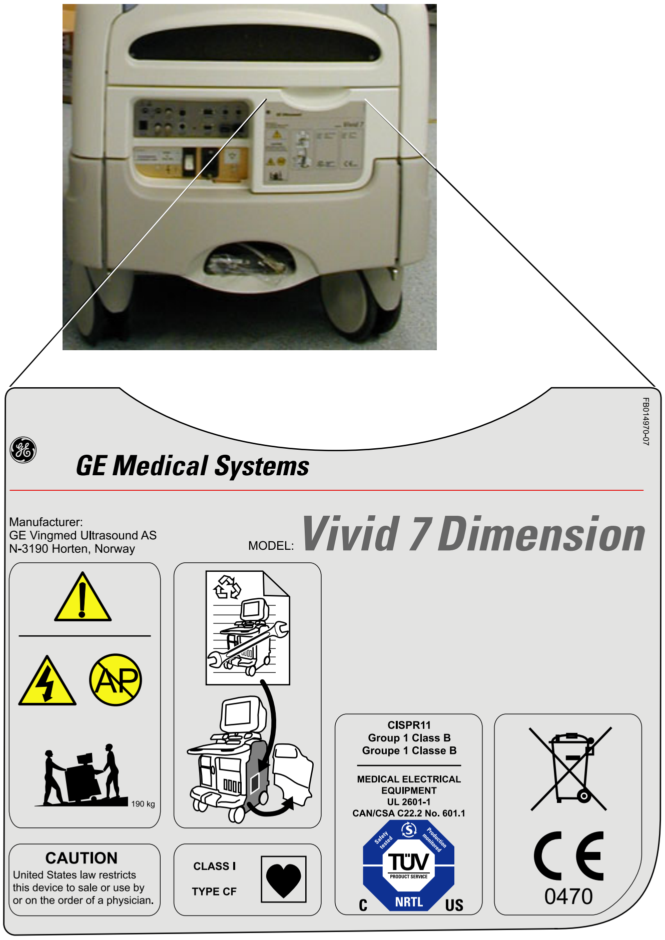
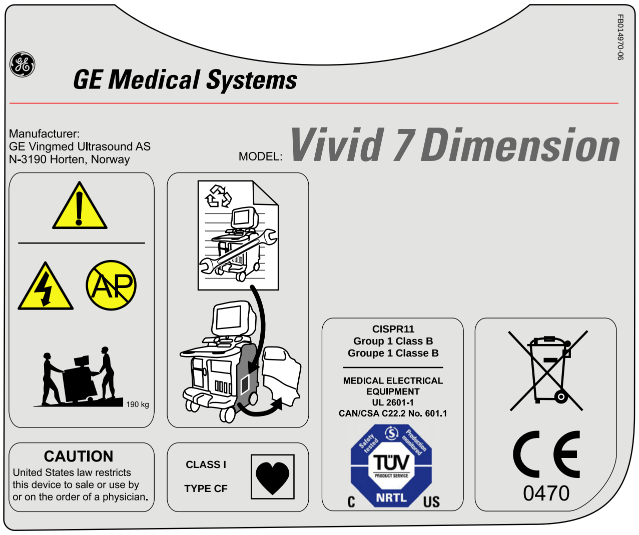
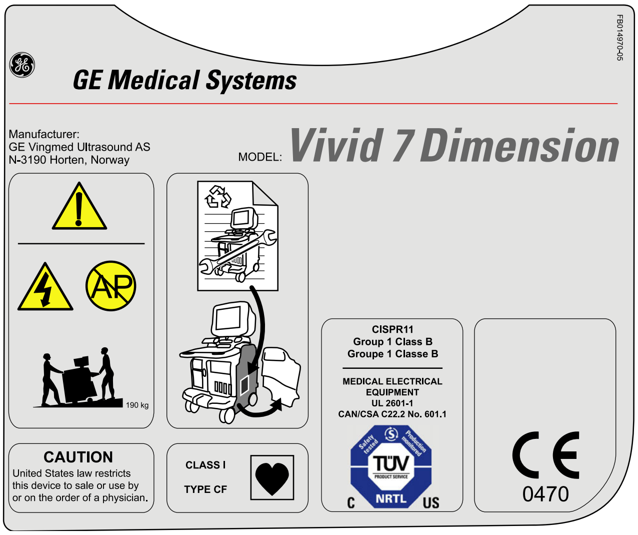
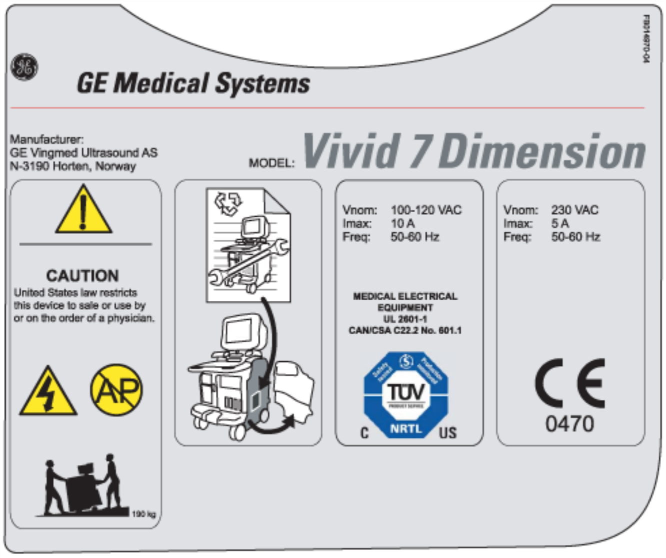
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 *Dimension* after OCT. 2005	 FB014970-07 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF CE 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 *Dimension* between JUNE 2005 and OCT. 2005.	 FB014970-06 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF CE 0470

Table 1-15 Label on Rear Cover - Vivid 7 Dimension (cont'd) sheet 2 of 2

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 Dimension	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension 190 kg CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV C NRTL US CE 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 Dimension, *after* September 2004.	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension CAUTION United States law restricts this device to sale or use by or on the order of a physician. 190 kg Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV C NRTL US Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz CE 0470

1-5-8 Label on Rear Cover - Vivid 7

Table 1-16 Label on Rear Cover - Vivid 7 sheet 1 of 2

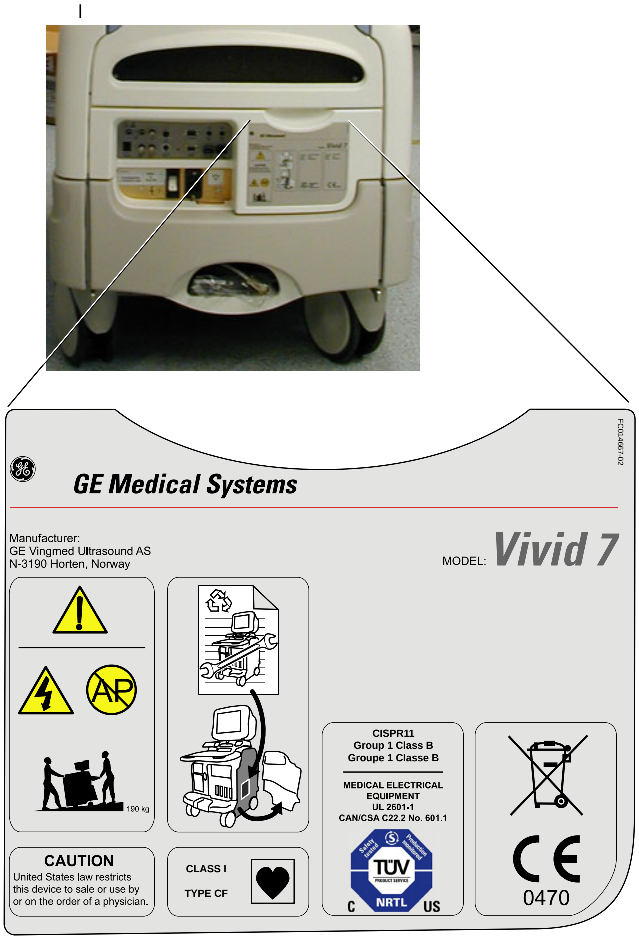
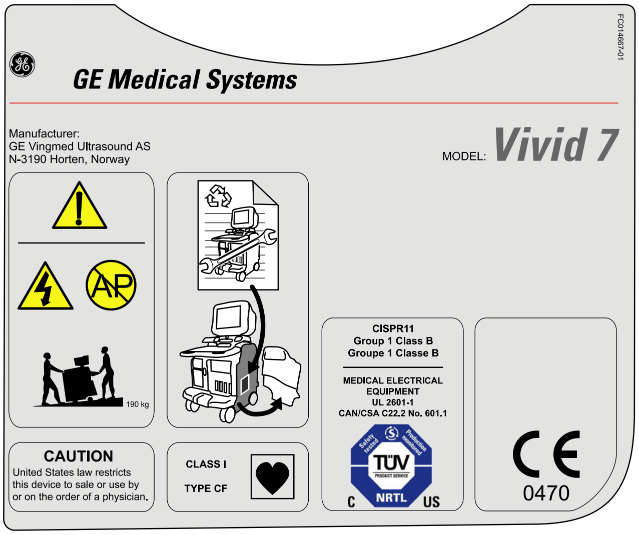
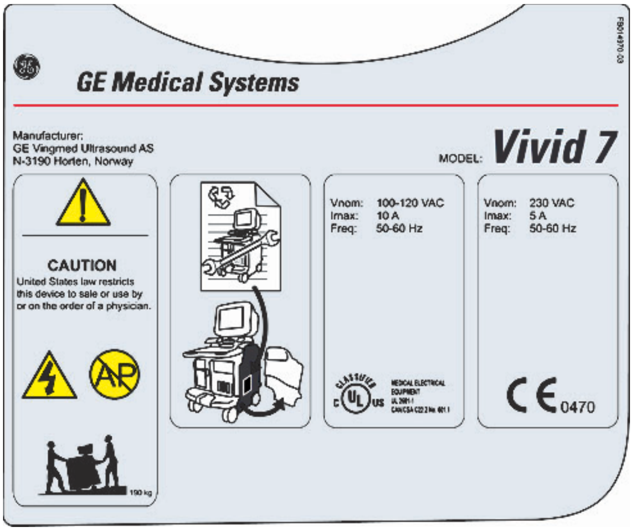
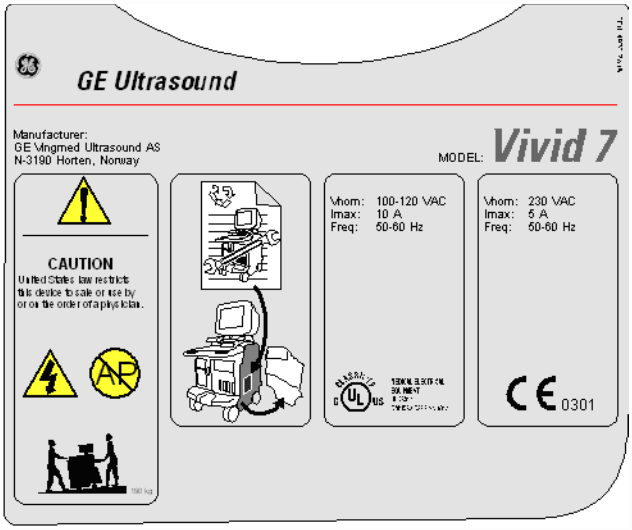
<table>
<tr><th>DESCRIPTION</th><th>ILLUSTRATION</th></tr>
<tr><td>Label, General Info
(Located on rear of system)
Label used for Vivid 7
after JUNY 2005</td><td>

FC014667-02
GE Medical Systems
Manufacturer:
GE Vingmed Ultrasound AS
N-3190 Horten, Norway
MODEL: Vivid 7
190 kg
CAUTION
United States law restricts this device to sale or use by or on the order of a physician.
CLASS I
TYPE CF
CISPR11
Group 1 Class B
Groupe 1 Classe B
MEDICAL ELECTRICAL EQUIPMENT
UL 2601-1
CAN/CSA C22.2 No. 601.1
TÜV
NRTL
C
US
CE
0470
</td></tr>
<tr><td>Label, General Info
(Located on rear of system)
Label used for Vivid 7</td><td>

FC014667-01
GE Medical Systems
Manufacturer:
GE Vingmed Ultrasound AS
N-3190 Horten, Norway
MODEL: Vivid 7
190 kg
CAUTION
United States law restricts this device to sale or use by or on the order of a physician.
CLASS I
TYPE CF
CISPR11
Group 1 Class B
Groupe 1 Classe B
MEDICAL ELECTRICAL EQUIPMENT
UL 2601-1
CAN/CSA C22.2 No. 601.1
TÜV
NRTL
C
US
CE
0470
</td></tr>
</table>

Table 1-16 Label on Rear Cover - Vivid 7 (cont'd) sheet 2 of 2

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 *between* 2 May 2002 and September 2004.	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP 190 kg Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz c UL us CE 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 *before* 2 May 2002	 GE Ultrasound Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz c UL us CE 0301

1-5-9 Label on Rear Cover - Vivid 7 PRO

Table 1-17 Label on Rear Cover - Vivid 7 PRO sheet 1 of 2

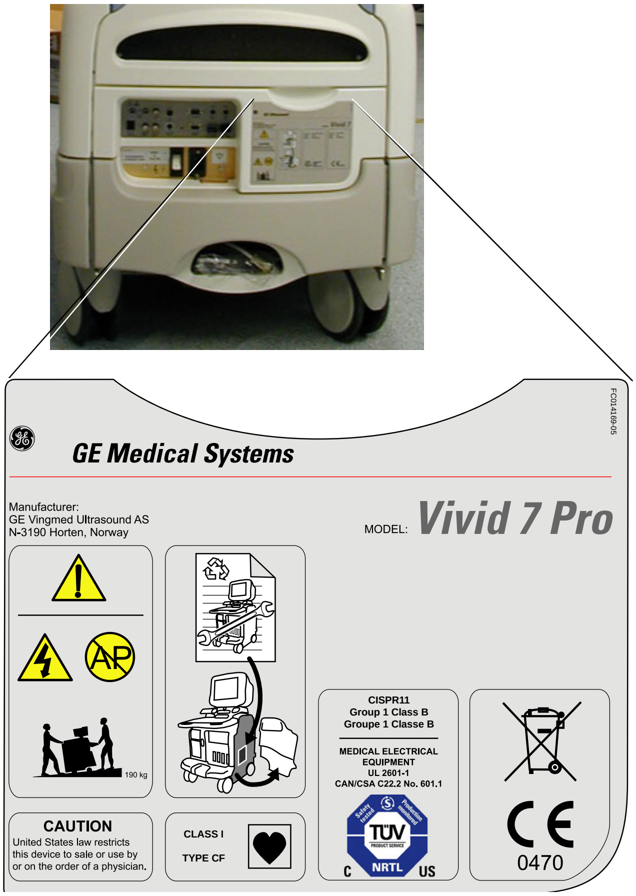
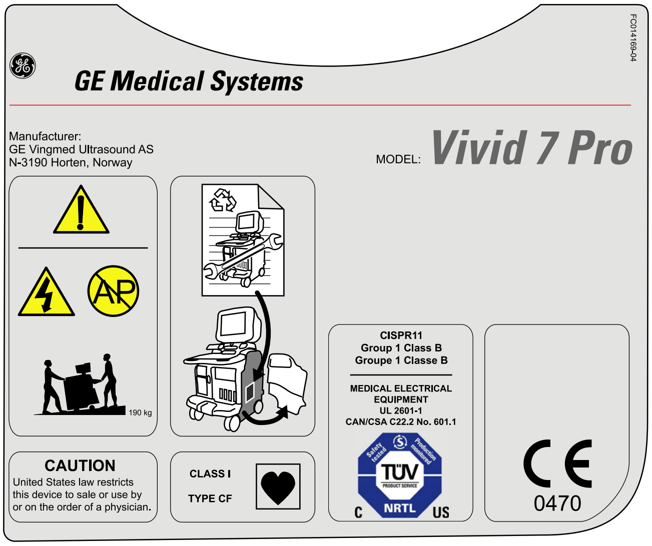
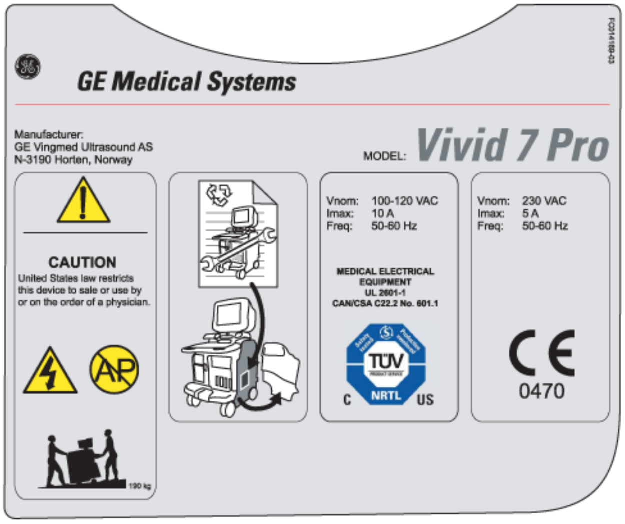
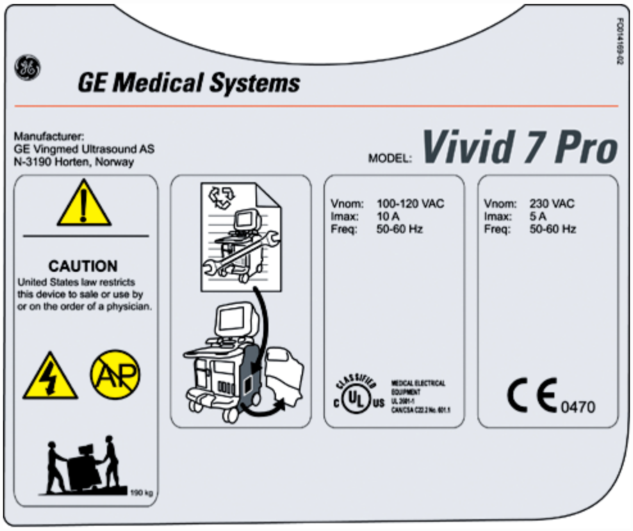
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO introduced JUNE 2005	 FC014169-05 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF TÜV NRTL C US 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO introduced March 2005	 FC014169-04 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF TÜV NRTL C US 0470

Table 1-17 Label on Rear Cover - Vivid 7 PRO (cont'd) sheet 2 of 2

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO introduced September 2004	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP 190 kg Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz CE 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO before September 2004	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP 190 kg Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz CLASSIFIED c UL us MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz CE 0470

1-5-10 Label on Rear Cover - Vivid 7 Dimension for China

Table 1-18 Label on Rear Cover - Vivid 7 Dimension for China sheet 1 of 4

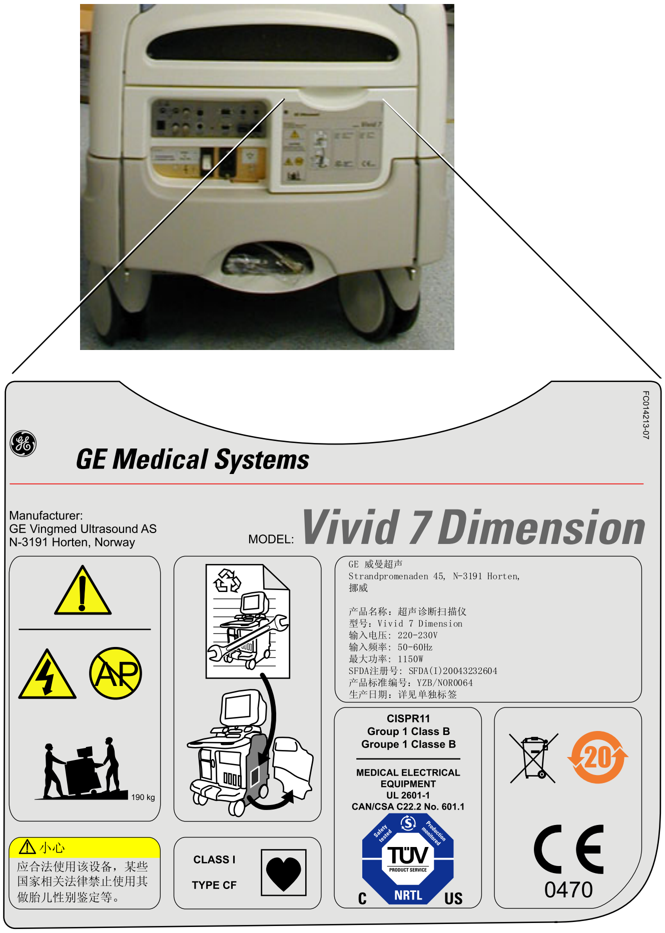
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced FEBRUARY 2007	 FC014213-07 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3191 Horten, Norway MODEL: Vivid 7 Dimension GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Dimension 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SFDA(I)20043232604 产品标准编号：YZB/NOR0064 生产日期：详见单独标签 190 kg ⚠ 小心 应合法使用该设备，某些国家相关法律禁止使用其做胎儿性别鉴定等。 CLASS I TYPE CF CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 Safety tested Production monitored TÜV PRODUCT SERVICE C NRTL US 20 CE 0470

Table 1-18 Label on Rear Cover - Vivid 7 Dimension for China (cont'd) sheet 2 of 4

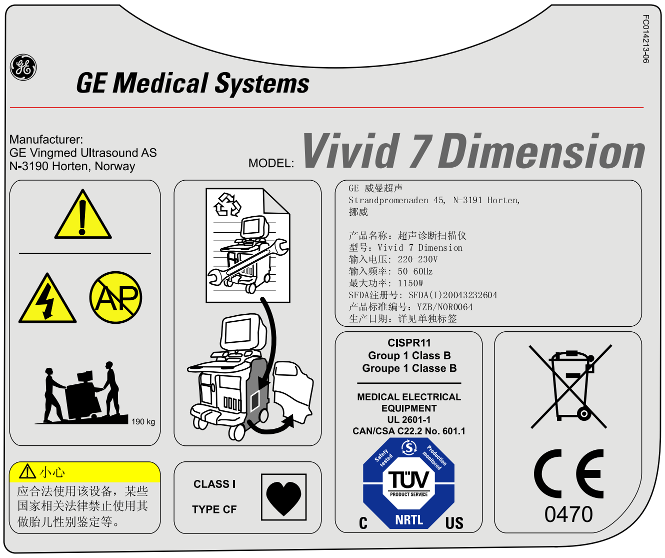
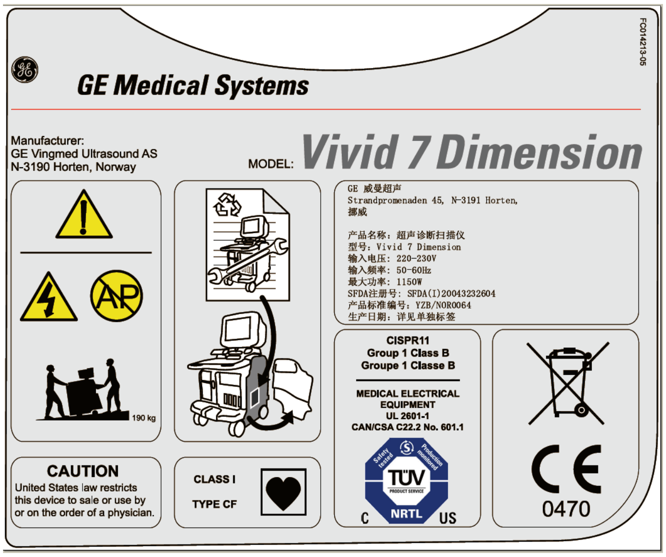
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced OCTOBER 2005	 FC014213-06 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Dimension 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SFDA(I)20043232604 产品标准编号：YZB/NOR0064 生产日期：详见单独标签 AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US 0470 小心 应合法使用该设备，某些国家相关法律禁止使用其做胎儿性别鉴定等。 CLASS I TYPE CF
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced SEPTEMBER 2005	 FC014213-05 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Dimension 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SFDA(I)20043232604 产品标准编号：YZB/NOR0064 生产日期：详见单独标签 AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US 0470 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF

Table 1-18 Label on Rear Cover - Vivid 7 Dimension for China (cont'd) sheet 3 of 4

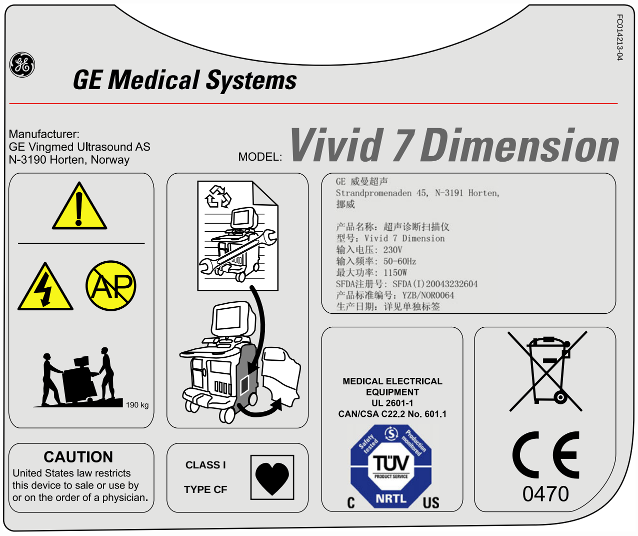
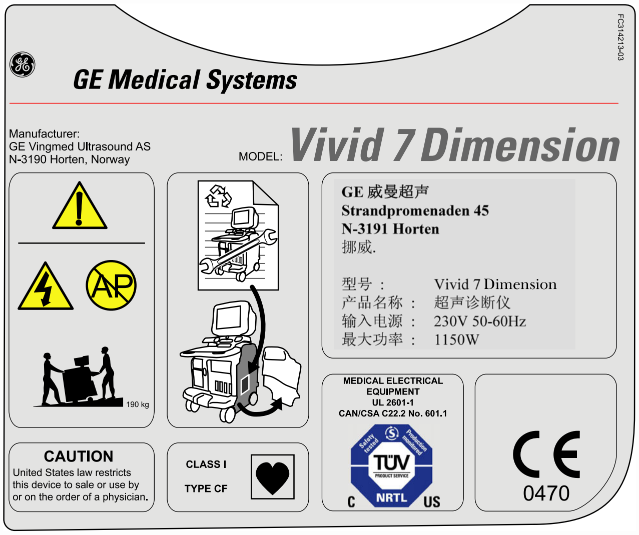
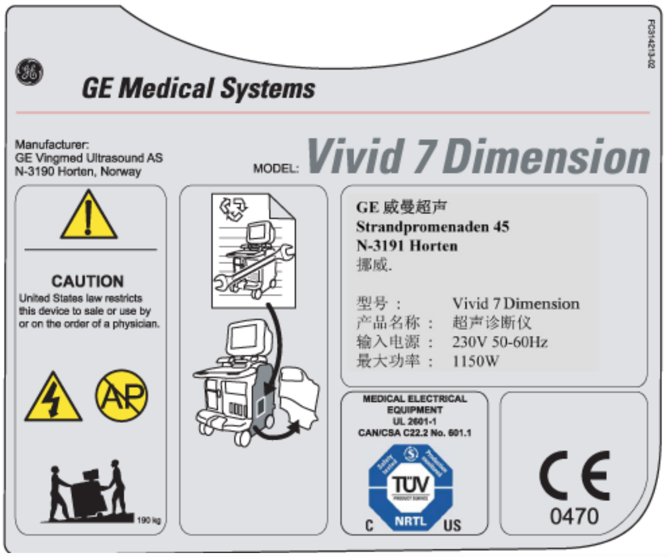
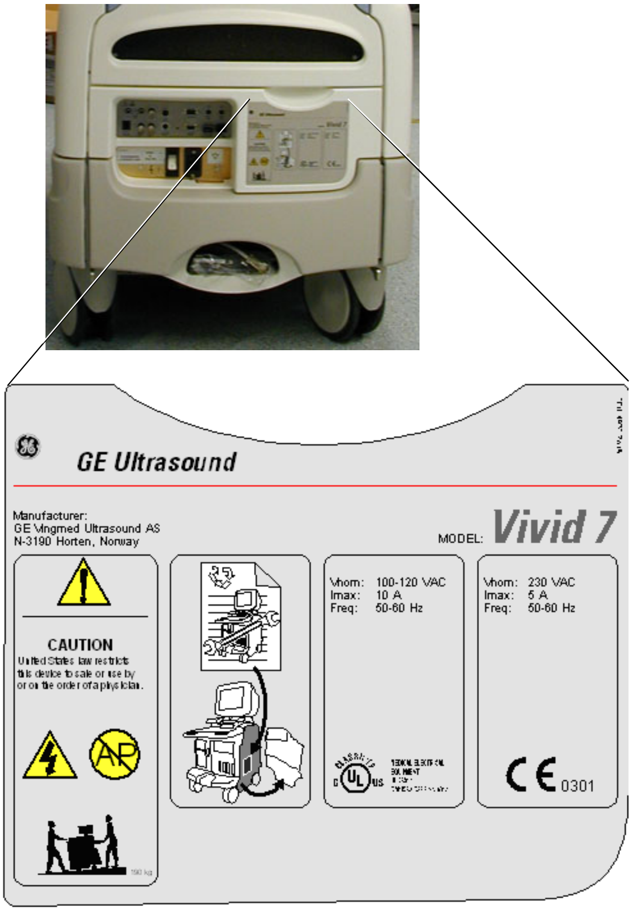
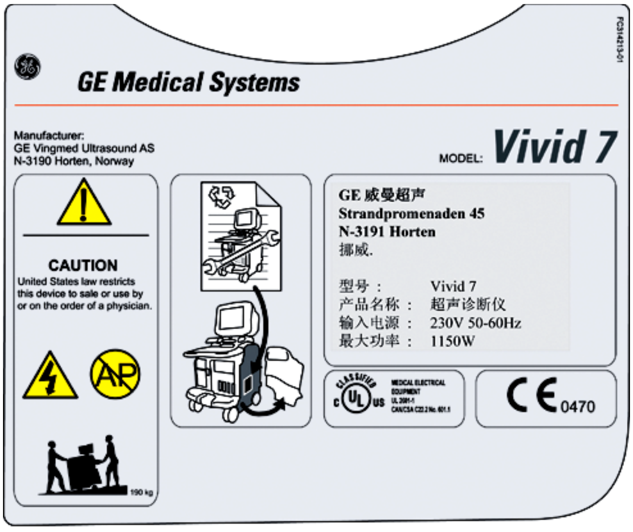
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced JUNE 2005	 FC014213-04 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Dimension 输入电压：230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SFDA(I)20043232604 产品标准编号：YZB/NOR0064 生产日期：详见单独标签 190 kg MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 C TÜV NRTL US CE 0470 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced March 2005	 FC314213-03 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号 ： Vivid 7 Dimension 产品名称 ： 超声诊断仪 输入电源 ： 230V 50-60Hz 最大功率 ： 1150W 190 kg MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 C TÜV NRTL US CE 0470 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF

Table 1-18 Label on Rear Cover - Vivid 7 Dimension for China (cont'd) sheet 4 of 4

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 to China introduced September 2004	 FC314213-02 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Dimension CAUTION United States law restricts this device to sale or use by or on the order of a physician. 190 kg GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号 ： Vivid 7 Dimension 产品名称 ： 超声诊断仪 输入电源 ： 230V 50-60Hz 最大功率 ： 1150W MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US CE 0470

1-5-11 Label on Rear Cover - Vivid 7 for China

Table 1-19 Label on Rear Cover - Vivid 7 for China

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 *before* 2 May 2002	 GE Ultrasound Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP Vnom: 100-120 VAC Imax: 10 A Freq: 50-60 Hz Vnom: 230 VAC Imax: 5 A Freq: 50-60 Hz 0301
Label, General Info (Located on rear of system) Label used for Vivid 7 to China before September 2004	 FC314213-01 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 CAUTION United States law restricts this device to sale or use by or on the order of a physician. AP 190 kg GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号： Vivid 7 产品名称： 超声诊断仪 输入电源： 230V 50-60Hz 最大功率： 1150W CLASSIFIED c UL US MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 CE 0470

1-5-12 Label on Rear Cover - Vivid 7 PRO for China

Table 1-20 Label on Rear Cover - Vivid 7 PRO for China sheet 1 of 4

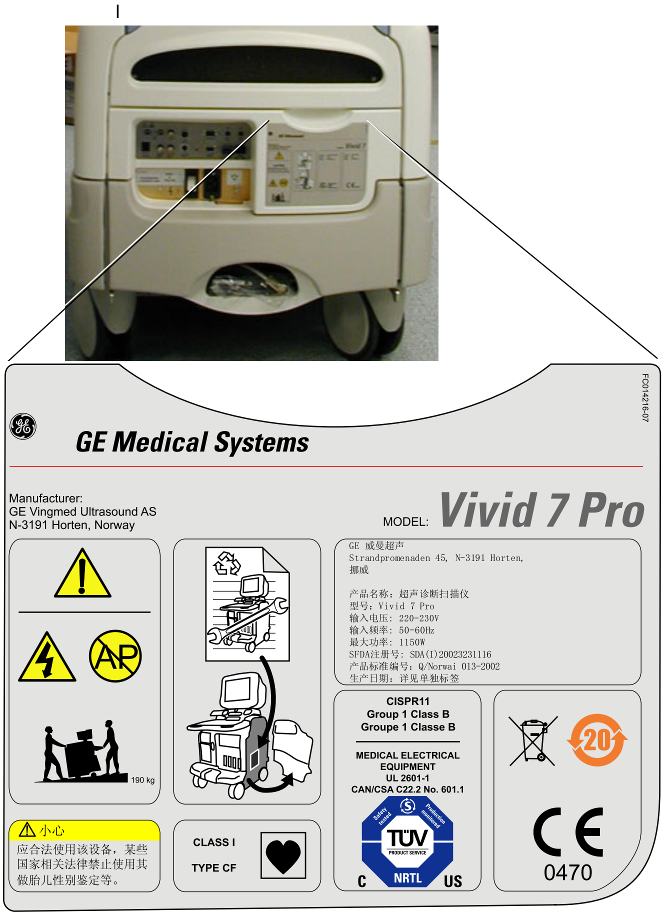
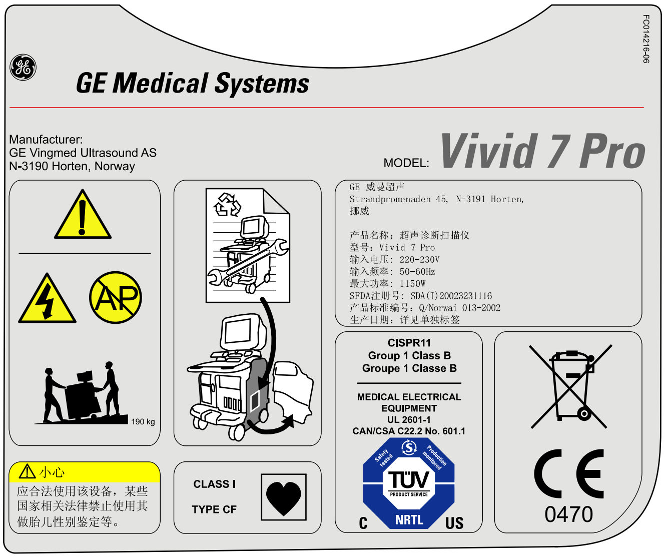
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China introduced FEBRUARY 2007	 FC014216-07 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3191 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Pro 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SDA(I)20023231116 产品标准编号：Q/Norwai 013-2002 生产日期：详见单独标签 AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US 20 0470 小心 应合法使用该设备，某些国家相关法律禁止使用其做胎儿性别鉴定等。 CLASS I TYPE CF
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China introduced OCTOBER 2005	 FC014216-06 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Pro 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SDA(I)20023231116 产品标准编号：Q/Norwai 013-2002 生产日期：详见单独标签 AP 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 TÜV NRTL C US 0470 小心 应合法使用该设备，某些国家相关法律禁止使用其做胎儿性别鉴定等。 CLASS I TYPE CF

Table 1-20 Label on Rear Cover - Vivid 7 PRO for China (cont'd) sheet 2 of 4

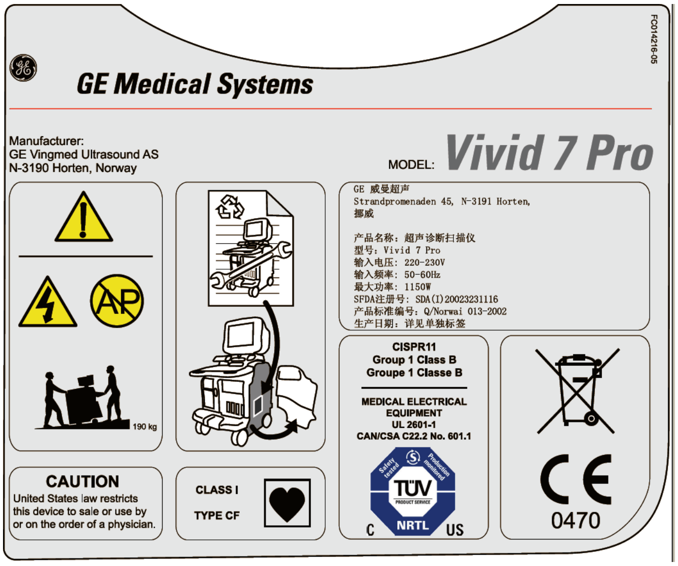
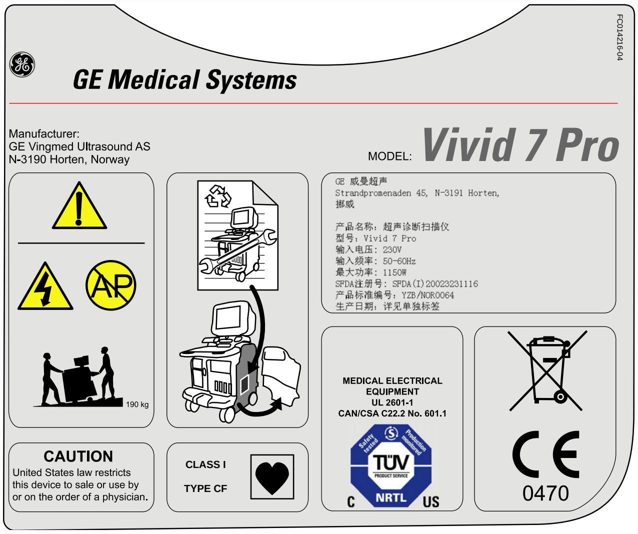
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China introduced SEPTEMBER 2005	 FC014216-05 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Pro 输入电压：220-230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SDA(I)20023231116 产品标准编号：Q/Norwai 013-2002 生产日期：详见单独标签 190 kg CISPR11 Group 1 Class B Groupe 1 Classe B MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF C TÜV NRTL US 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China after JUNY 2005	 FC014216-04 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45, N-3191 Horten, 挪威 产品名称：超声诊断扫描仪 型号：Vivid 7 Pro 输入电压：230V 输入频率：50-60Hz 最大功率：1150W SFDA注册号：SFDA(I)20023231116 产品标准编号：YZB/NOR0064 生产日期：详见单独标签 190 kg MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF C TÜV NRTL US 0470

Table 1-20 Label on Rear Cover - Vivid 7 PRO for China (cont'd) sheet 3 of 4

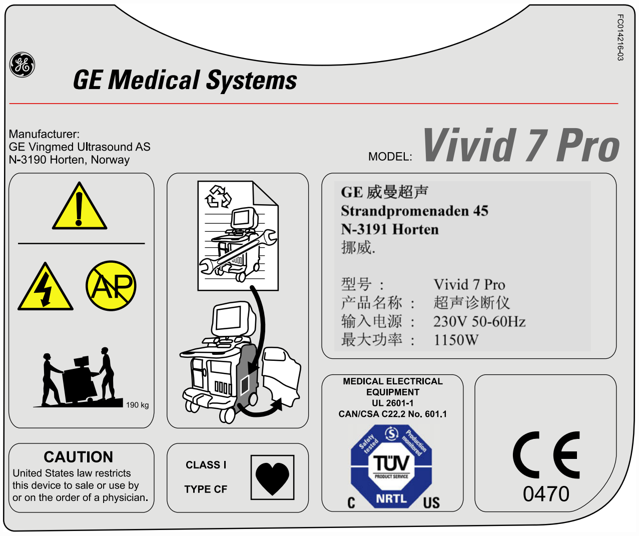
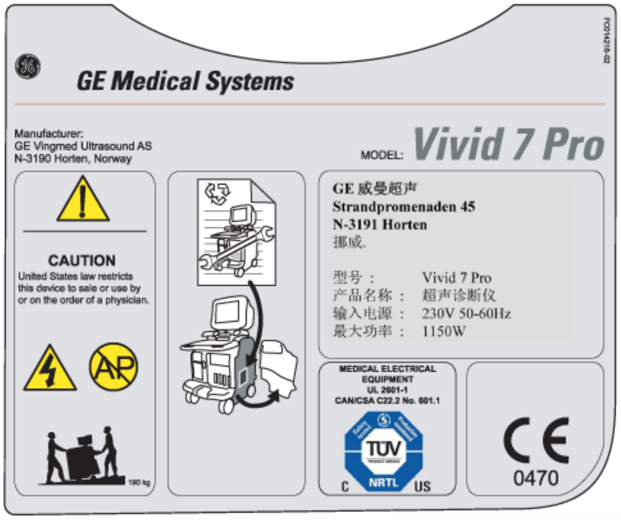
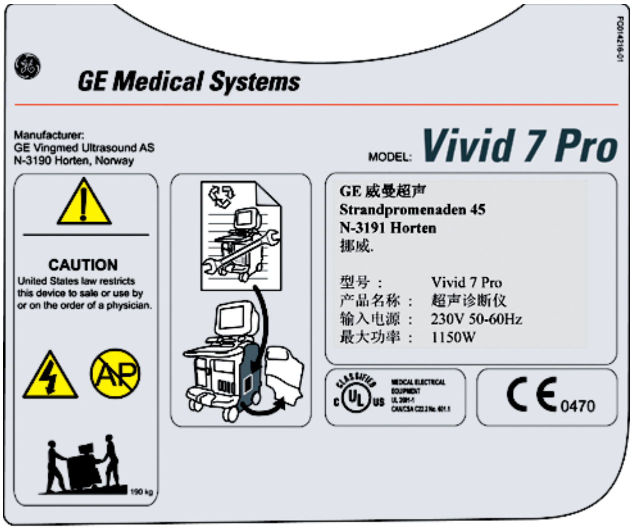
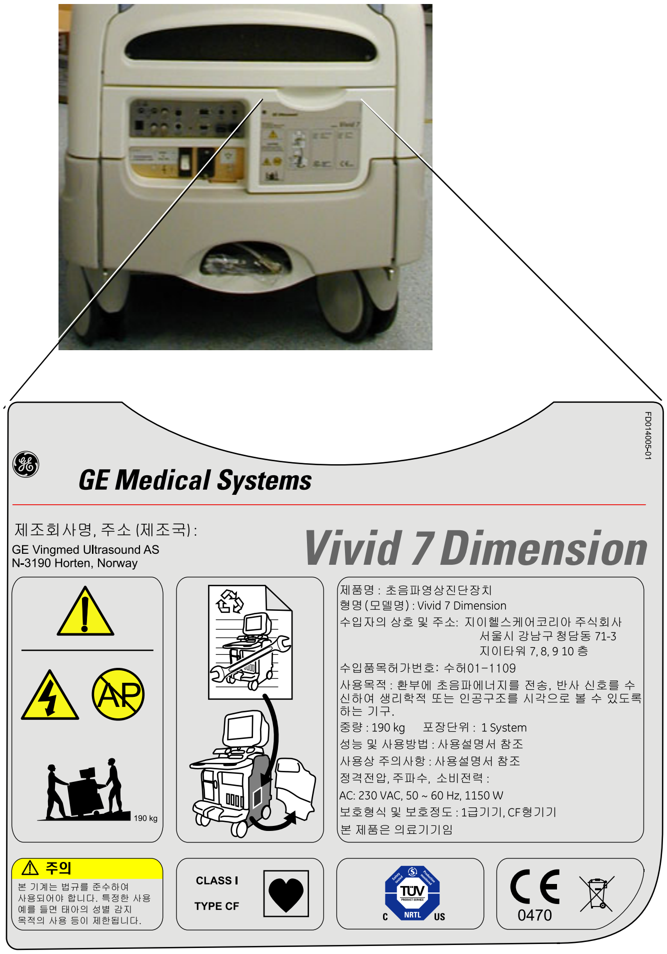
DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China	 FC014216-03 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号： Vivid 7 Pro 产品名称： 超声诊断仪 输入电源： 230V 50-60Hz 最大功率： 1150W 190 kg CAUTION United States law restricts this device to sale or use by or on the order of a physician. CLASS I TYPE CF MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 C TÜV NRTL US CE 0470
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China after September 2004	 FC014216-02 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号： Vivid 7 Pro 产品名称： 超声诊断仪 输入电源： 230V 50-60Hz 最大功率： 1150W CAUTION United States law restricts this device to sale or use by or on the order of a physician. 190 kg MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1 C TÜV NRTL US CE 0470

Table 1-20 Label on Rear Cover - Vivid 7 PRO for China (cont'd) sheet 4 of 4

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 PRO to China before September 2004	 GE Medical Systems Manufacturer: GE Vingmed Ultrasound AS N-3190 Horten, Norway MODEL: Vivid 7 Pro CAUTION United States law restricts this device to sale or use by or on the order of a physician. GE 威曼超声 Strandpromenaden 45 N-3191 Horten 挪威. 型号： Vivid 7 Pro 产品名称： 超声诊断仪 输入电源： 230V 50-60Hz 最大功率： 1150W 0470 190 kg FC014216-01

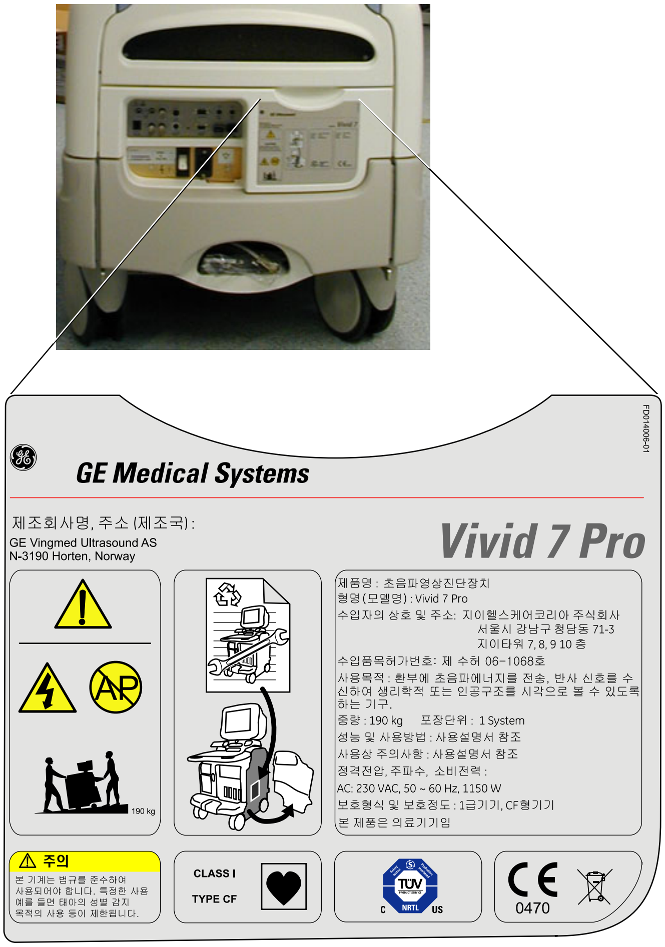
1-5-13 Label on Rear Cover - Vivid 7 Dimension for Korea

Table 1-21 Label on Rear Cover - Vivid 7 Dimension for Korea

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 Dimension after DEC. 2006	 FD014005-01 GE Medical Systems 제조회사명, 주소 (제조국) : GE Vingmed Ultrasound AS N-3190 Horten, Norway Vivid 7 Dimension 제품명 : 초음파영상진단장치 형명 (모델명) : Vivid 7 Dimension 수입자의 상호 및 주소: 지이헬스케어코리아 주식회사 서울시 강남구 청담동 71-3 지이타워 7, 8, 9 10 층 수입품목허가번호: 수허01-1109 사용목적 : 환부에 초음파에너지를 전송, 반사 신호를 수신하여 생리학적 또는 인공구조를 시각으로 볼 수 있도록 하는 기구. 중량 : 190 kg 포장단위 : 1 System 성능 및 사용방법 : 사용설명서 참조 사용상 주의사항 : 사용설명서 참조 정격전압, 주파수, 소비전력 : AC: 230 VAC, 50 ~ 60 Hz, 1150 W 보호형식 및 보호정도 : 1급기기, CF형기기 본 제품은 의료기기임 ⚠ 주의 본 기계는 법규를 준수하여 사용되어야 합니다. 특정한 사용 예를 들면 태아의 성별 감지 목적의 사용 등이 제한됩니다. CLASS I TYPE CF 190 kg TÜV PRODUCT SERVICE C NRTL US CE 0470

1-5-14 Label on Rear Cover - Vivid 7 PRO for Korea

Table 1-22 Label on Rear Cover - Vivid 7 PRO for Korea

DESCRIPTION	ILLUSTRATION
Label, General Info (Located on rear of system) Label used for Vivid 7 Dimension after DEC. 2006	I  FD014006-01 GE Medical Systems Vivid 7 Pro 190 kg CLASS I TYPE CF TÜV PRODUCT SERVICE Safety tested Production monitored C NRTL US 0470 제조회사명, 주소 (제조국) : GE Vingmed Ultrasound AS N-3190 Horten, Norway 제품명 : 초음파영상진단장치 형명(모델명) : Vivid 7 Pro 수입자의 상호 및 주소: 지이헬스케어코리아 주식회사 서울시 강남구 청담동 71-3 지이타워 7, 8, 9 10 층 수입품목허가번호: 제 수허 06-1068호 사용목적 : 환부에 초음파에너지를 전송, 반사 신호를 수신하여 생리학적 또는 인공구조를 시각으로 볼 수 있도록 하는 기구. 중량 : 190 kg 포장단위 : 1 System 성능 및 사용방법 : 사용설명서 참조 사용상 주의사항 : 사용설명서 참조 정격전압, 주파수, 소비전력 : AC: 230 VAC, 50 ~ 60 Hz, 1150 W 보호형식 및 보호정도 : 1급기기, CF형기기 본 제품은 의료기기임 ⚠ 주의 본 기계는 법규를 준수하여 사용되어야 합니다. 특정한 사용 예를 들면 태아의 성별 감지 목적의 사용 등이 제한됩니다.

1-5-15 Label on Rear Cover - Vivid 7 - Details Descriptions

Table 1-23 Label on Rear Cover - Vivid 7, Details Descriptions sheet 1 of 2

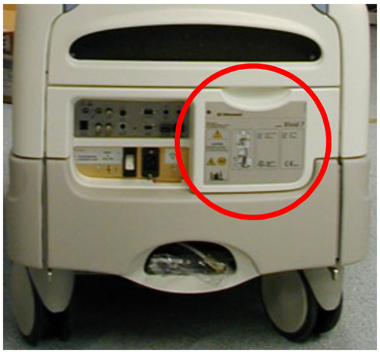
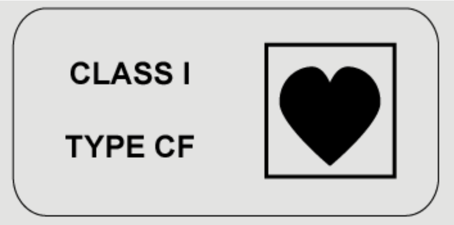
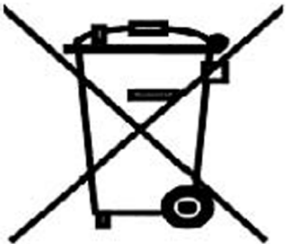
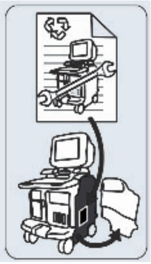
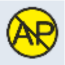
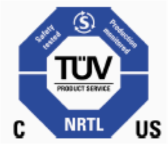
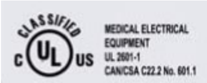
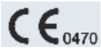
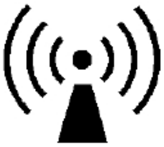
DESCRIPTION	ILLUSTRATION
Label on rear side of the Vivid 7.	
CLASS I The Vivid 7 ultrasound unit is a Class I device, type CF, according to Sub-clause 14 of IEC60601-1 (1988). **TYPE CF** Equipment Type CF (heart in the box symbol) IEC 878-02-05 indicates equipment having a floating applied part having a degree of protection suitable for direct cardiac contact.	
This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	
Please refer to the Recycling instructions on the label located outside the Front End Card Rack's Cover (Inside the unit), see Figure 1-20 on page 1-64 and Figure 1-23 on page 1-67.	
The system is not designed for use with flammable anesthetic gases.	

Table 1-23 Label on Rear Cover - Vivid 7, Details Descriptions (cont'd) sheet 2 of 2

DESCRIPTION	ILLUSTRATION
Vivid 7 SCANNERS PRODUCED AFTER SEPTEMBER 2004: "TESTED AND PRODUCTION MONITORED BY TUV PRODUCT SERVICE NRTL WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL2601-1 AND CAN/CSA C22.2 NO.601.1" Products produced before September 2004 will bear the c-UL-us Classification mark, shown below.	**Vivid 7 SCANNERS PRODUCED AFTER SEPTEMBER 2004:**  Safety tested Production monitored TÜV PRODUCT SERVICE C NRTL US
Vivid 7 SCANNERS PRODUCED BEFORE SEPTEMBER 2004: "CLASSIFIED BY UNDERWRITERS LABORATARIES INC WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL2601-1 AND CAN/CSA C22.2 NO.601.1"	 CLASSIFIED C UL US MEDICAL ELECTRICAL EQUIPMENT UL 2601-1 CAN/CSA C22.2 No. 601.1
This unit carries the CE mark. The Vivid 7 unit complies with regulatory requirements of the European Directive 93/ 42/EEC concerning medical devices. It also complies with emission limits for a Group 1, Class B Medical Device as stated in EN 60601-1-2 (IEC 60601-1-2). (Units produced before 2 May 2002 have the CE0301 label.)	
The sign indicates that Non Ionizing Radiation is/may be emitted from the unit.	

1-5-16 Labels on Internal I/O (Inside Scanner)

Label on Front-End Card Cage Side of Internal I/O

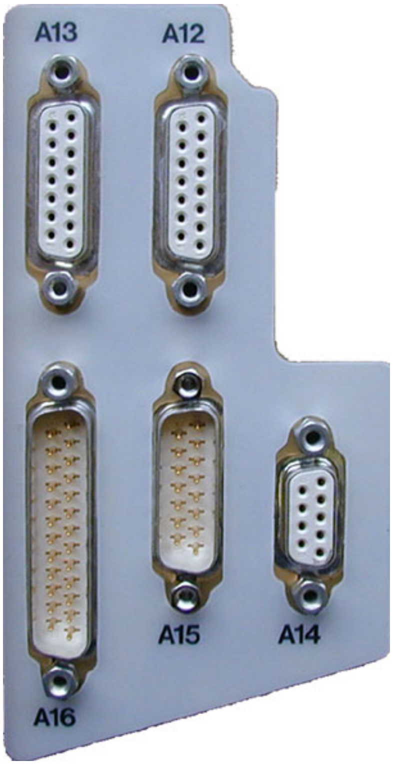


Figure 1-2 Labels on Internal I/O (Inside Scanner), Front-End Card Cage Side of Internal I/O

1-5-17 Labels on Internal I/O (Inside Scanner)

Label on Back-End Processor Side of Internal I/O

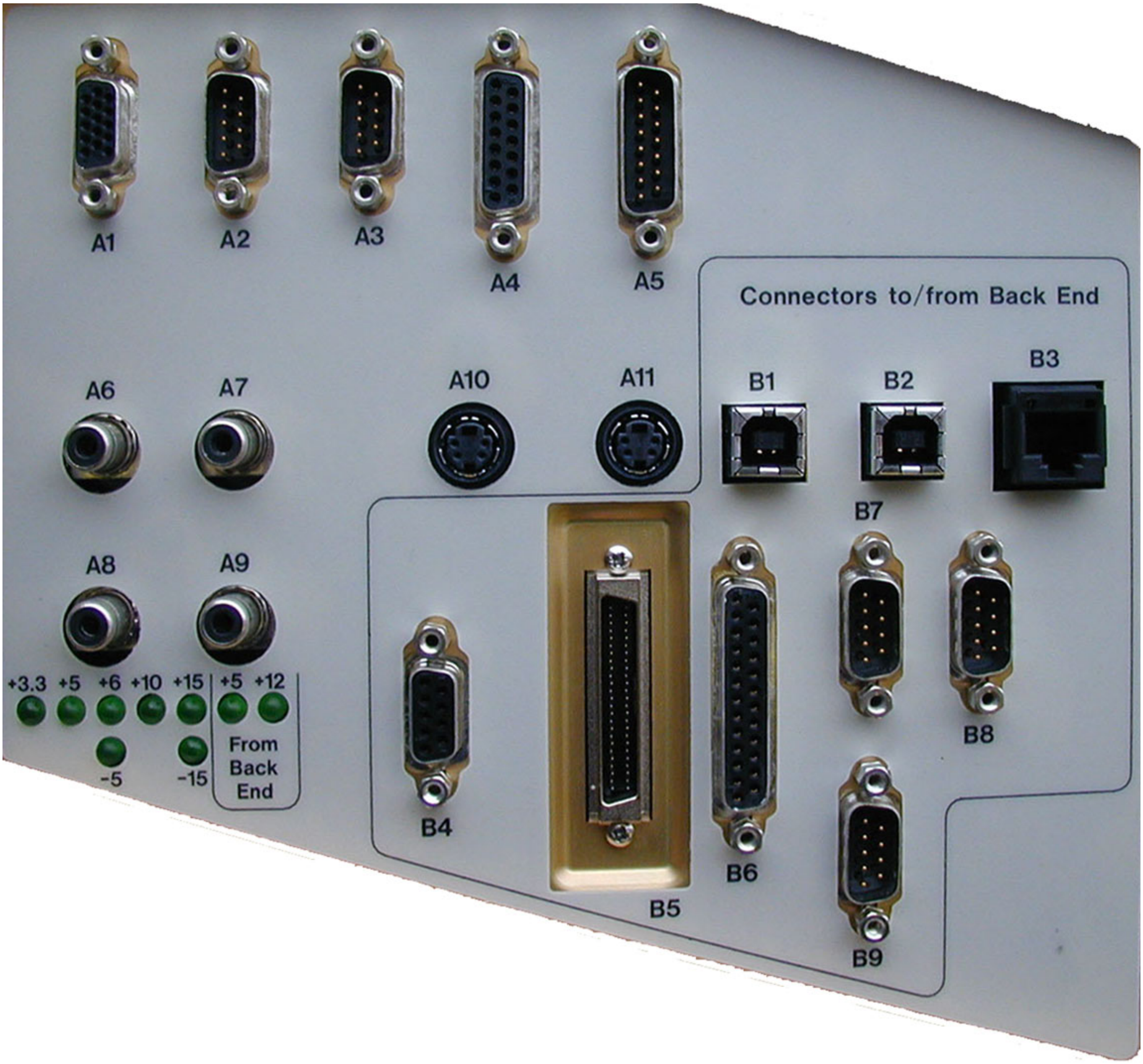
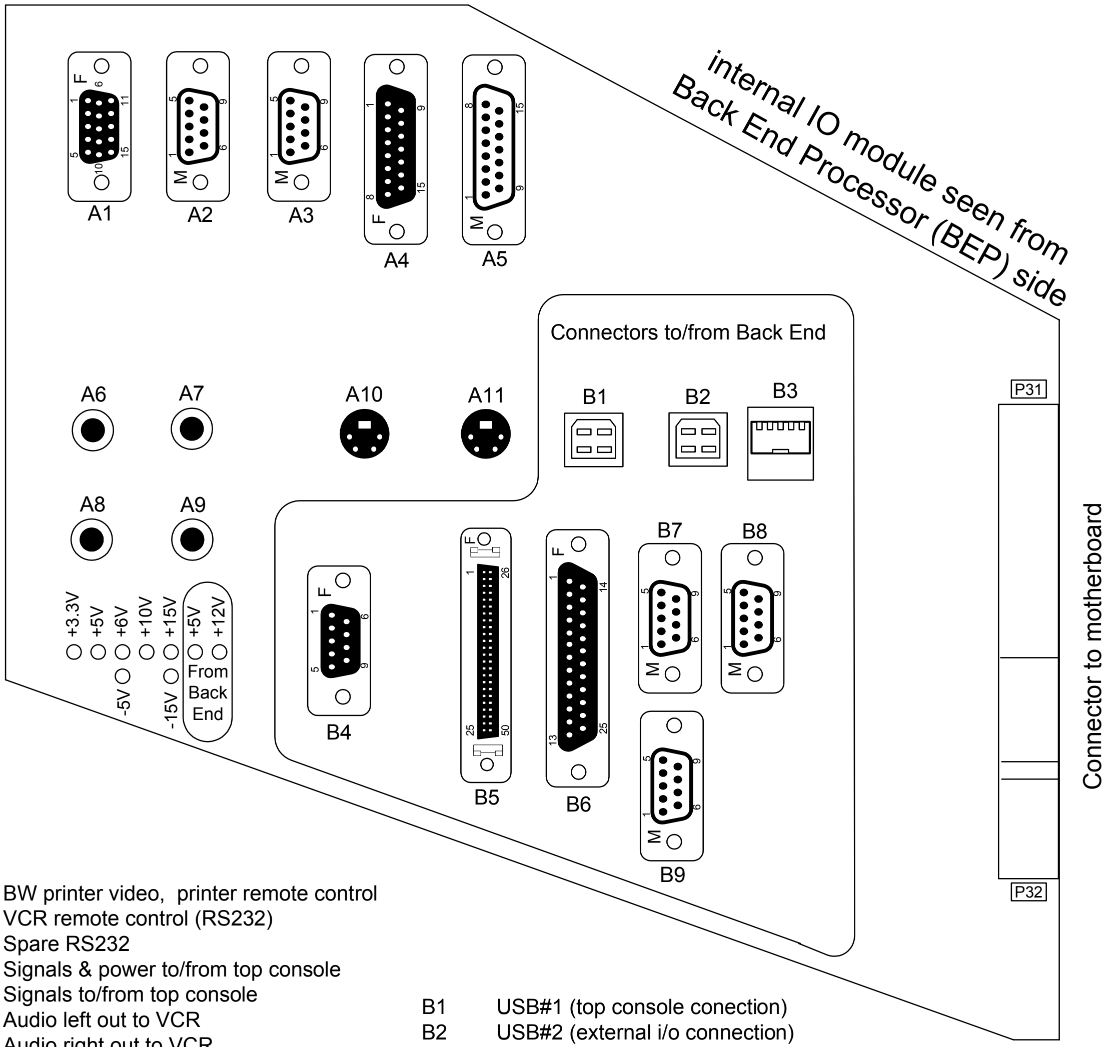

A1
A2
A3
A4
A5
Connectors to/from Back End
A6
A7
A10
A11
B1
B2
B3
B7
A8
A9
+3.3
+5
+6
+10
+15
+5
+12
-5
-15
From Back End
B4
B5
B6
B8
B9

Figure 1-3 Labels on Internal I/O (Inside Scanner), Back-End Processor Side of Internal I/O

1-5-17 Labels on Internal I/O (Inside Scanner) (cont'd)


internal IO module seen from
Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
A6
A7
A10
A11
B1
B2
B3
P31
A8
A9
B7
B8
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From
Back
End
B4
B5
B6
B9
P32
Connector to motherboard

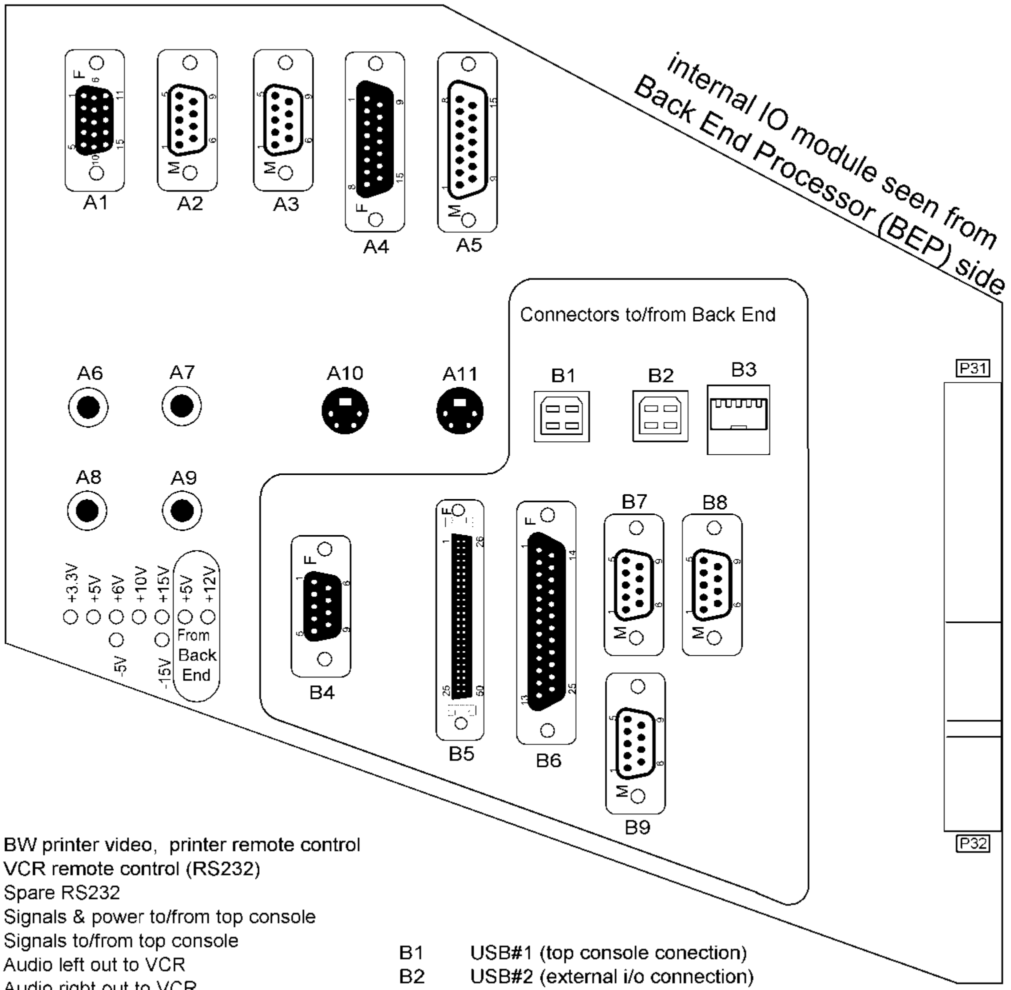
A1	BW printer video, printer remote control
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR
A11	SVideo in from VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	COM (external i/o connection) NOT USED
B8	COM (modem - setup as COM2)
B9	BEP Power Supply control (UPS)

Figure 1-4 Label on Internal I/O on units with BEP2

1-5-17 Labels on Internal I/O (Inside Scanner) (cont'd)

NOTE: On units with RFI ONLY: A11 has been moved from the Internal I/O module to the BEP.


internal IO module seen from Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
A6
A7
A10
A11
B1
B2
B3
P31
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
B4
B5
B6
B7
B8
B9
P32
Connector to motherboard

A1	BW printer video, printer remote control
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR
A11	SVideo in from VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	COM (external i/o connection) NOT USED
B8	COM (modem - setup as COM2)
B9	BEP Power Supply control (UPS)

Figure 1-5 Label on Internal I/O on units with BEP2.2, BEP3 and BEP3.2

1-5-18 Label, Internal Connections (Int.Conn.)

Located on the outside of the Front-End Card Rack (FEP1) Cover (inside Vivid 7). Different versions of the label have been used since production start.

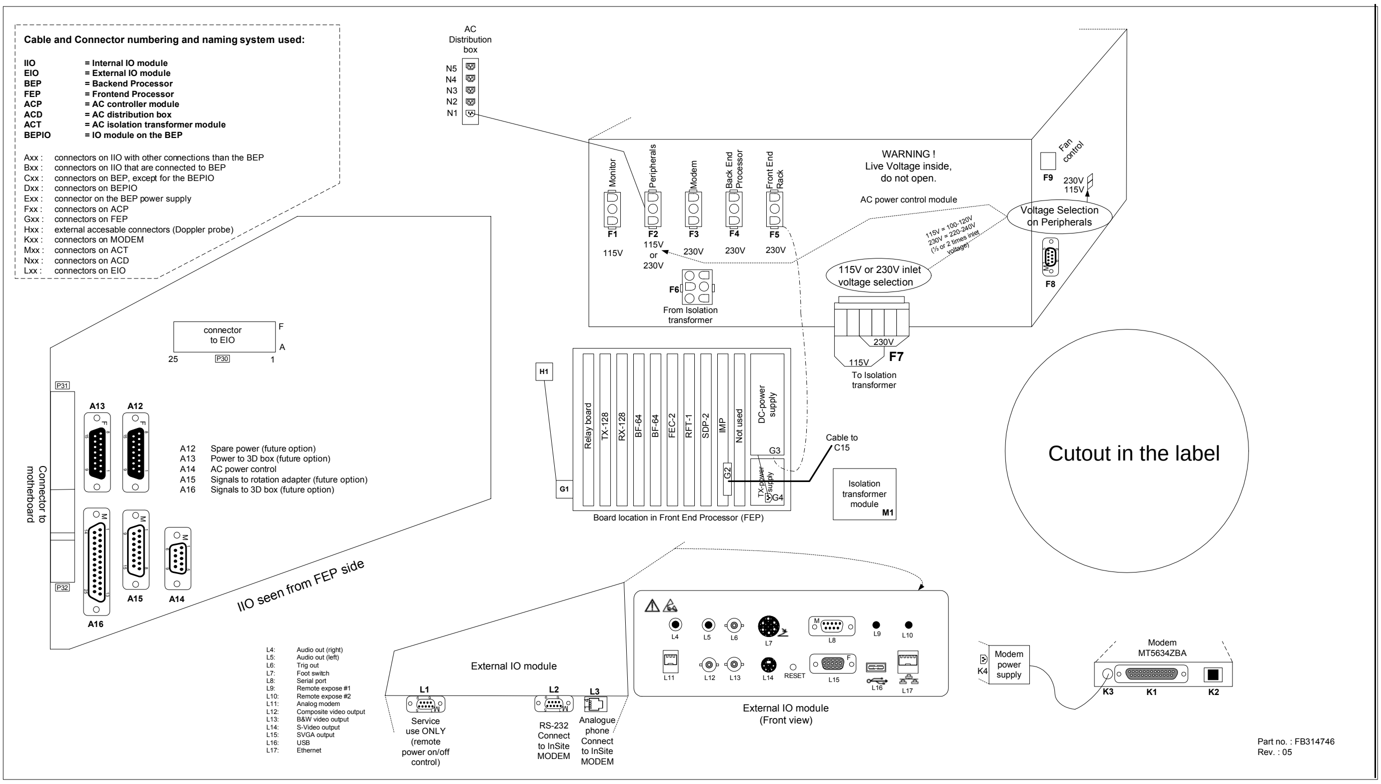

Cable and Connector numbering and naming system used:
IIO = Internal IO module
EIO = External IO module
BEP = Backend Processor
FEP = Frontend Processor
ACP = AC controller module
ACD = AC distribution box
ACT = AC isolation transformer module
BEPIO = IO module on the BEP
Axx : connectors on IIO with other connections than the BEP
Bxx : connectors on IIO that are connected to BEP
Cxx : connectors on BEP, except for the BEPIO
Dxx : connectors on BEPIO
Exx : connector on the BEP power supply
Fxx : connectors on ACP
Gxx : connectors on FEP
Hxx : external accesable connectors (Doppler probe)
Kxx : connectors on MODEM
Mxx : connectors on ACT
Nxx : connectors on ACD
Lxx : connectors on EIO
AC Distribution box
N5
N4
N3
N2
N1
Monitor
Peripherals
Modem
Back End Processor
Front End Rack
F1
F2
F3
F4
F5
115V
115V or 230V
230V
230V
230V
F6
From Isolation transformer
WARNING ! Live Voltage inside, do not open.
AC power control module
Fan control
F9
230V
115V
Voltage Selection on Peripherals
115V = 100-120V
230V = 220-240V
(½ or 2 times inlet voltage)
115V or 230V inlet voltage selection
F8
230V
115V
F7
To Isolation transformer
connector to EIO
F
A
25
P30
1
P31
A13
A12
Connector to motherboard
A12 Spare power (future option)
A13 Power to 3D box (future option)
A14 AC power control
A15 Signals to rotation adapter (future option)
A16 Signals to 3D box (future option)
P32
A16
A15
A14
IIO seen from FEP side
H1
G1
Relay board
TX-128
RX-128
BF-64
BF-64
FEC-2
RFT-1
SDP-2
IMP
Not used
DC-power supply
G3
G2
TX-power supply
G4
Board location in Front End Processor (FEP)
Cable to C15
Isolation transformer module
M1
Cutout in the label
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
RESET
L15
L16
L17
External IO module (Front view)
L4: Audio out (right)
L5: Audio out (left)
L6: Trig out
L7: Foot switch
L8: Serial port
L9: Remote expose #1
L10: Remote expose #2
L11: Analog modem
L12: Composite video output
L13: B&W video output
L14: S-Video output
L15: SVGA output
L16: USB
L17: Ethernet
External IO module
L1
L2
L3
Service use ONLY (remote power on/off control)
RS-232 Connect to InSite MODEM
Analogue phone Connect to InSite MODEM
K4
Modem power supply
Modem MT5634ZBA
K3
K1
K2
Part no. : FB314746
Rev. : 05

Figure 1-6 Label on FEP1, Internal Connections

1-5-19 Label, Internal Connections (Int.Conn.)

Located on the outside of the Front-End Card Rack’s cover (inside unit). Different versions of the label have been used since production start.

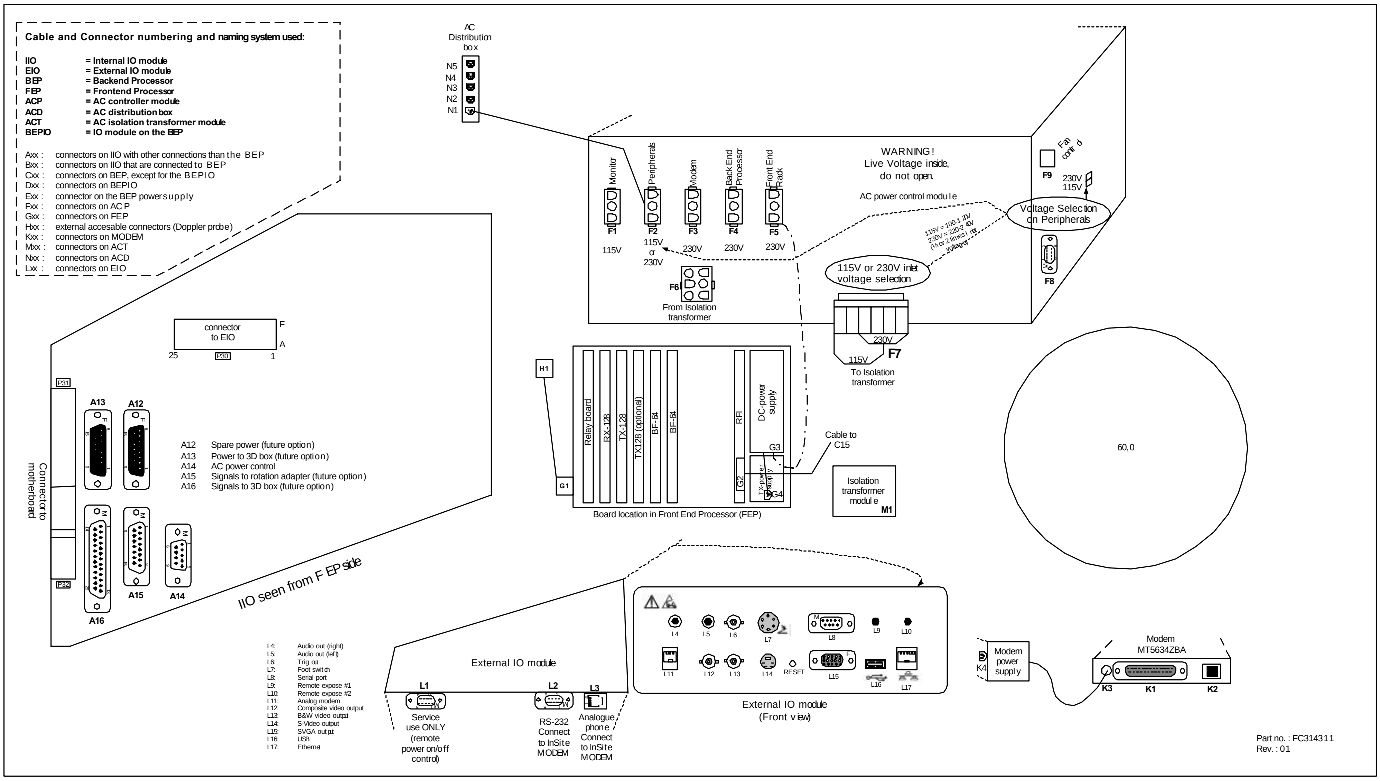
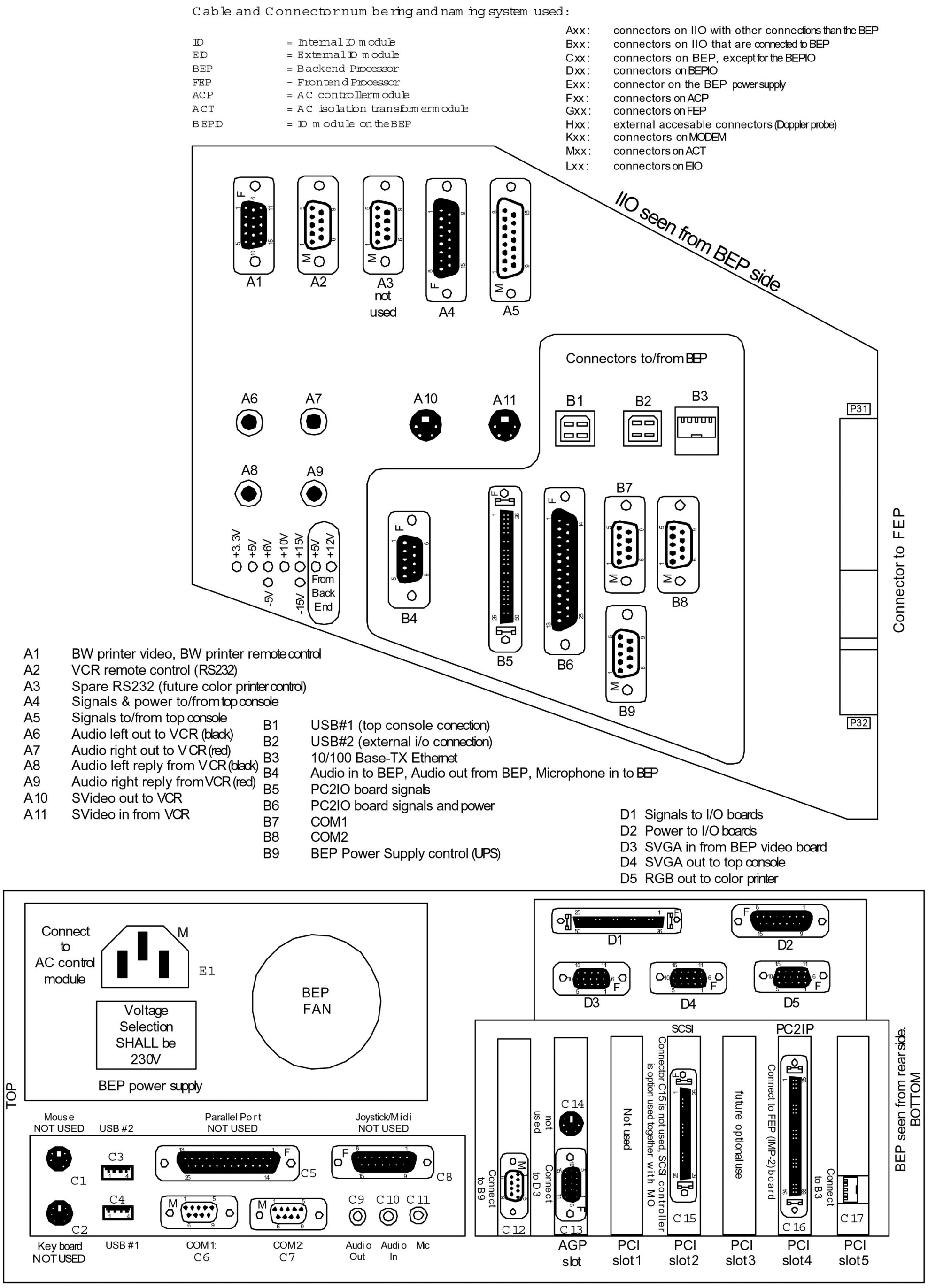

Cable and Connector numbering and naming system used:
IIO = Internal IO module
EIO = External IO module
BEP = Backend Processor
FEP = Frontend Processor
ACP = AC controller module
ACD = AC distribution box
ACT = AC isolation transformer module
BEPIO = IO module on the BEP
Axx : connectors on IIO with other connections than the BEP
Bxx : connectors on IIO that are connected to BEP
Cxx : connectors on BEP, except for the BEPIO
Dxx : connectors on BEPIO
Exx : connector on the BEP power supply
Fxx : connectors on ACP
Gxx : connectors on FEP
Hxx : external accesable connectors (Doppler probe)
Kxx : connectors on MODEM
Mxx : connectors on ACT
Nxx : connectors on ACD
Lxx : connectors on EIO
AC Distribution box
N5
N4
N3
N2
N1
connector to EIO
F
A
25
P30
1
P31
P32
Connector to motherboard
A13
A12
A16
A15
A14
A12 Spare power (future option)
A13 Power to 3D box (future option)
A14 AC power control
A15 Signals to rotation adapter (future option)
A16 Signals to 3D box (future option)
IIO seen from F EP side
Monitor
Peripherals
Modem
Back End Processor
Front End Rack
F1
F2
F3
F4
F5
115V
115V or 230V
230V
230V
230V
F6
From Isolation transformer
WARNING! Live Voltage inside, do not open.
AC power control module
Fan control
F9
230V
115V
Voltage Selection on Peripherals
115V = 100-120V
230V = 220-240V
(½ or 2 times inlet voltage)
115V or 230V inlet voltage selection
F8
230V
115V
F7
To Isolation transformer
H1
G1
Relay board
RX-128
TX-128
TX128 (optional)
BF-64
BF-64
RFI
DC-power supply
G3
G2
TX-power supply
G4
Board location in Front End Processor (FEP)
Cable to C15
Isolation transformer module
M1
60,0
L4: Audio out (right)
L5: Audio out (left)
L6: Trig out
L7: Foot switch
L8: Serial port
L9: Remote expose #1
L10: Remote expose #2
L11: Analog modem
L12: Composite video output
L13: B&W video output
L14: S-Video output
L15: SVGA output
L16: USB
L17: Ethernet
External IO module
L1
L2
L3
Service use ONLY (remote power on/off control)
RS-232 Connect to InSite MODEM
Analogue phone Connect to InSite MODEM
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
RESET
L15
L16
L17
External IO module (Front view)
K4
Modem power supply
Modem MT5634ZBA
K3
K1
K2
Part no. : FC314311
Rev. : 01

Figure 1-7 Label on FEP2 (w/RFI)

1-5-20 Label, BEP1, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor’s Cover (inside unit)



Cable and Connector numbering and naming system used:

IIO = Internal IO module
EIO = External IO module
BEP = Backend Processor
FEP = Frontend Processor
ACP = AC controller module
ACT = AC isolation transformer module
BEPIO = IO module on the BEP

Axx: connectors on IIO with other connections than the BEP
Bxx: connectors on IIO that are connected to BEP
Cxx: connectors on BEP, except for the BEPIO
Dxx: connectors on BEPIO
Exx: connector on the BEP power supply
Fxx: connectors on ACP
Gxx: connectors on FEP
Hxx: external accesable connectors (Doppler probe)
Kxx: connectors on MODEM
Mxx: connectors on ACT
Lxx: connectors on EIO

A1	BW printer video, BW printer remote control
A2	VCR remote control (RS232)
A3	Spare RS232 (future color printer control)
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR (black)
A7	Audio right out to VCR (red)
A8	Audio left reply from VCR (black)
A9	Audio right reply from VCR (red)
A10	SVideo out to VCR
A11	SVideo in from VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	COM1
B8	COM2
B9	BEP Power Supply control (UPS)

D1	Signals to I/O boards
D2	Power to I/O boards
D3	SVGA in from BEP video board
D4	SVGA out to top console
D5	RGB out to color printer

IIO seen from BEP side
A1
A2
A3 not used
A4
A5
F
M
Connectors to/from BEP
A6
A7
A10
A11
B1
B2
B3
P31
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
B4
B5
B6
B7
B8
B9
P32
Connector to FEP
Connect to AC control module
M
E1
Voltage Selection SHALL be 230V
BEP power supply
BEP FAN
TOP
Mouse NOT USED
USB #2
Parallel Port NOT USED
Joystick/Midi NOT USED
C1
C2
C3
C4
C5
C8
C9
C10
C11
Key board NOT USED
USB #1
COM1: C6
COM2: C7
Audio Out
Audio In
Mic
D1
D2
D3
D4
D5
SCSI
PC2IP
C12
C13
C14
C15
C16
C17
Connect to B9
not used
Connect to D3
Not used
Connector C15 is not used, SCSI controller is option used together with MO
future optional use
Connect to FEP (IMP-2) board
Connect to B3
AGP slot
PCI slot1
PCI slot2
PCI slot3
PCI slot4
PCI slot5
BEP seen from rear side. BOTTOM

Part no. : FB314745 Rev. : 03

Figure 1-8 Label on BEP1, Internal Connections (Int.Conn.)

1-5-21 Label, BEP2, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor’s Cover (inside unit)

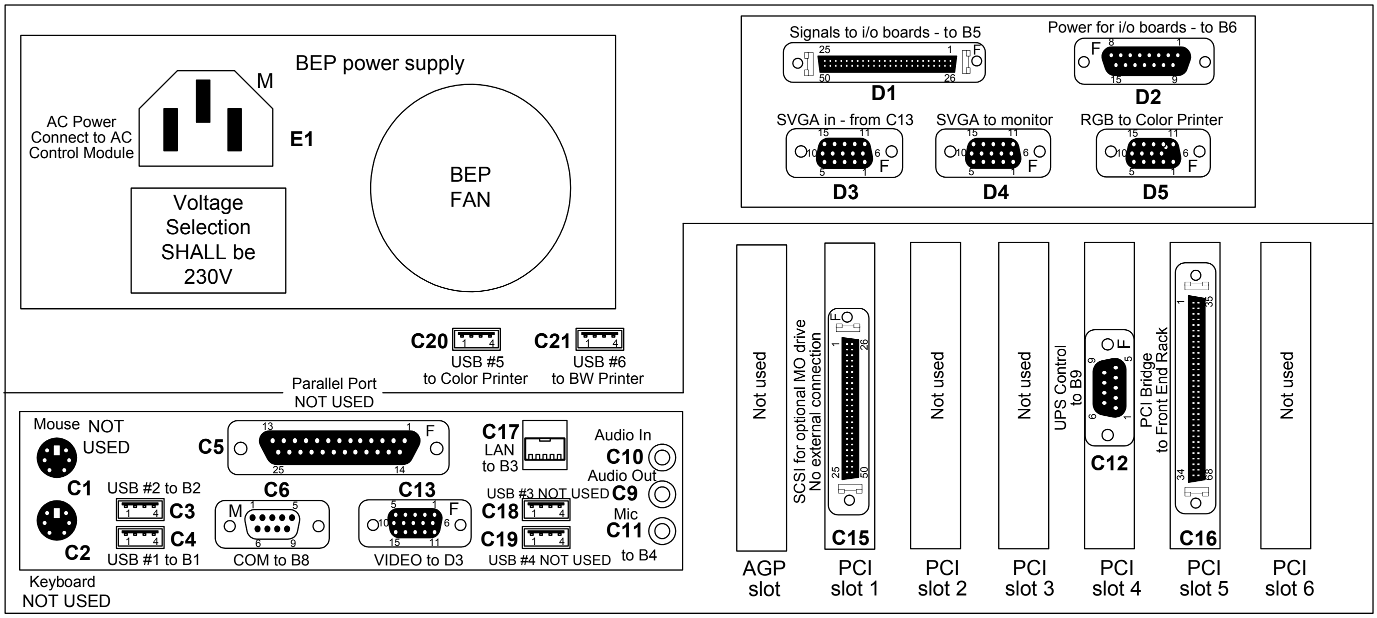

BEP power supply
AC Power Connect to AC Control Module
M
E1
Voltage Selection SHALL be 230V
BEP FAN
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
SVGA in - from C13
D3
SVGA to monitor
D4
RGB to Color Printer
D5
C20
USB #5 to Color Printer
C21
USB #6 to BW Printer
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
USB #2 to B2
C3
C4
USB #1 to B1
C5
C6
COM to B8
C13
VIDEO to D3
C17
LAN to B3
USB #3 NOT USED
C18
C19
USB #4 NOT USED
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Not used
AGP slot
SCSI for optional MO drive No external connection
C15
PCI slot 1
Not used
PCI slot 2
Not used
PCI slot 3
UPS Control to B9
C12
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 5
Not used
PCI slot 6

Figure 1-9 Label on BEP2, Internal Connections (Int.Conn.) (First version of label)

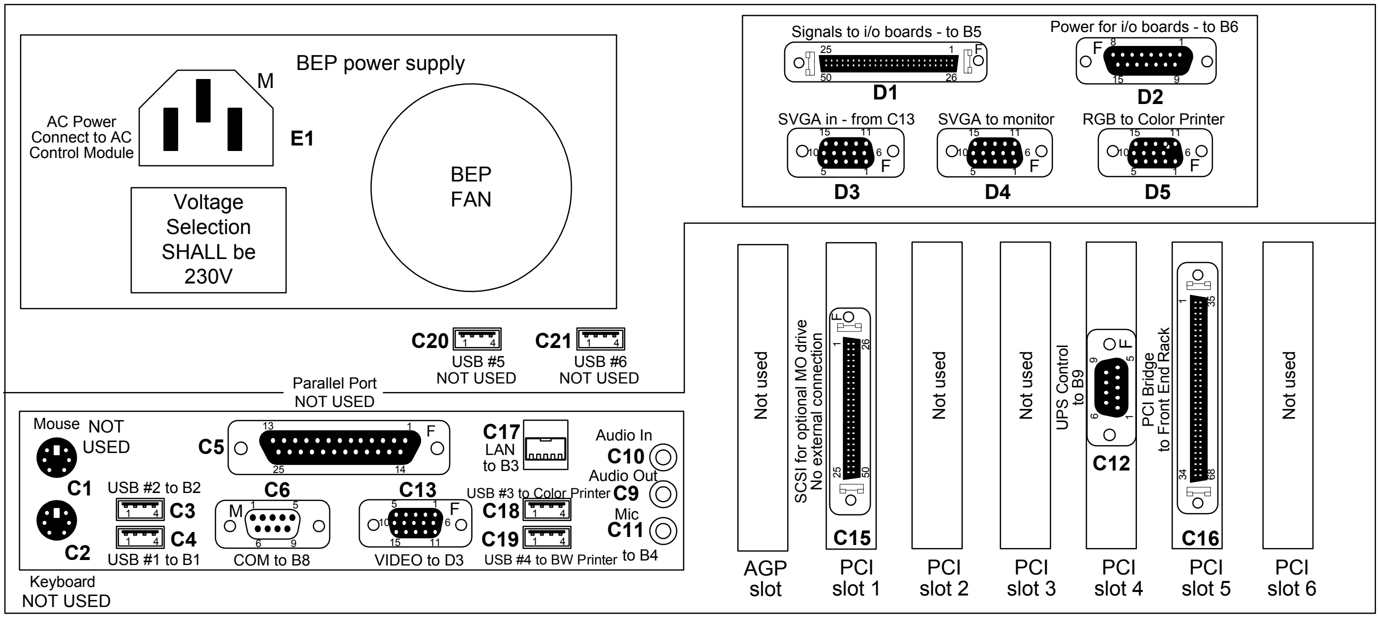
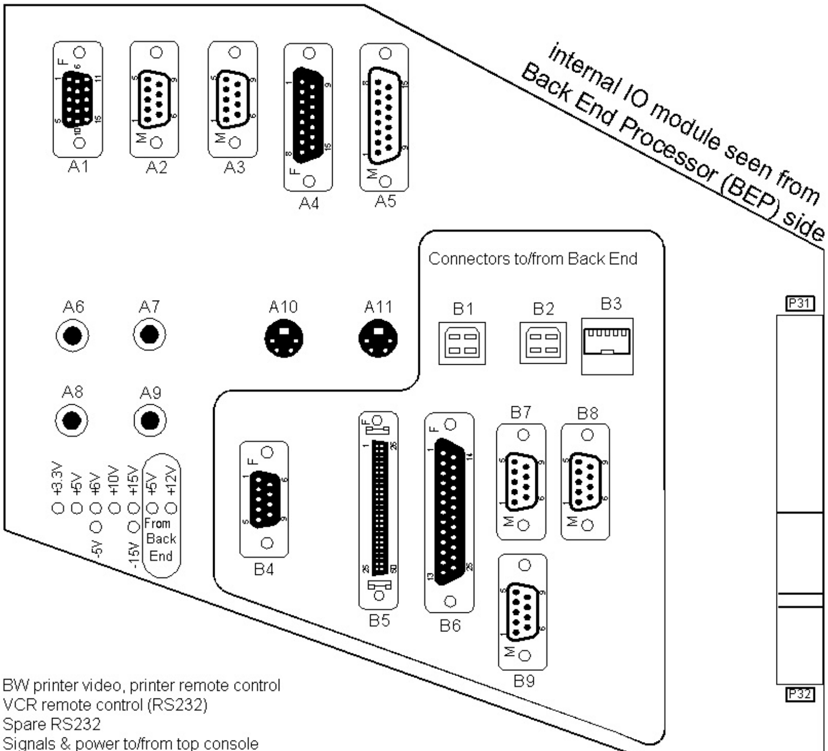

BEP power supply
AC Power Connect to AC Control Module
M
E1
Voltage Selection SHALL be 230V
BEP FAN
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
SVGA in - from C13
D3
SVGA to monitor
D4
RGB to Color Printer
D5
C20
USB #5 NOT USED
C21
USB #6 NOT USED
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
USB #2 to B2
C3
C4
USB #1 to B1
C5
C6
COM to B8
C13
VIDEO to D3
C17
LAN to B3
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Not used
AGP slot
SCSI for optional MO drive No external connection
C15
PCI slot 1
Not used
PCI slot 2
Not used
PCI slot 3
UPS Control to B9
C12
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 5
Not used
PCI slot 6

Figure 1-10 Label, BEP2, Internal Connections (Int.Conn.) (Second version of label)

1-5-22 Label, BEP4 as BEP2 Replacement, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor's Cover (inside Vivid 7)


Internal IO module seen from Back End Processor (BEP) side
A1
A2
A3
A4
A5
A6
A7
A10
A11
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
Connectors to/from Back End
B1
B2
B3
B4
B5
B6
B7
B8
B9
P31
P32
Connector to motherboard
F
M

A1	BW printer video, printer remote control
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR
A11	Svideo in from VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	NOT USED COM (was external i/o connection)
B8	COM (modem - setup as COM2)
B9	UPS connection

....

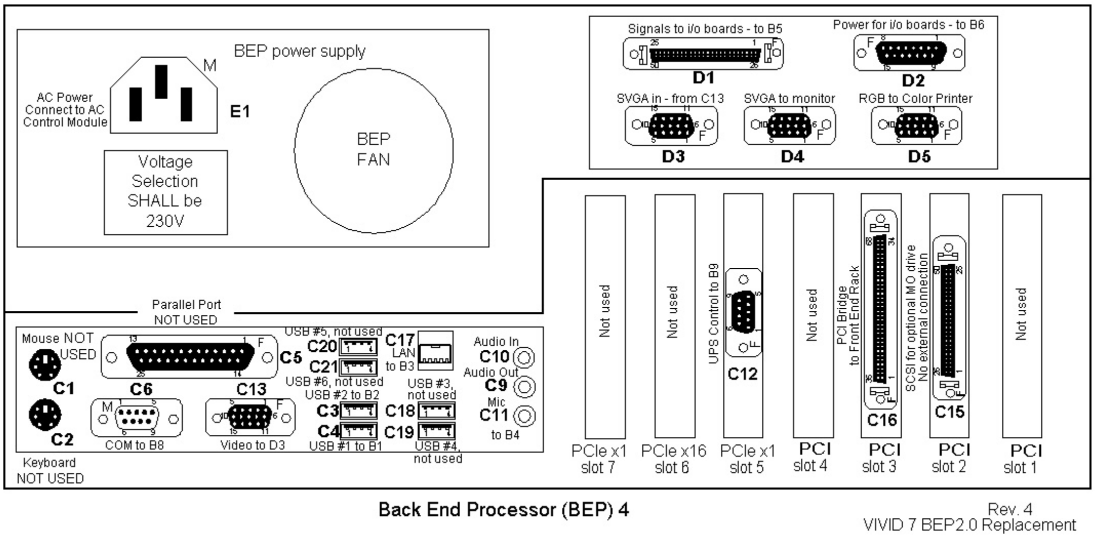

BEP power supply
AC Power Connect to AC Control Module
M
E1
Voltage Selection SHALL be 230V
BEP FAN
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
SVGA in - from C13
D3
SVGA to monitor
D4
RGB to Color Printer
D5
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
C5
C6
COM to B8
C13
Video to D3
USB #5, not used
C20
C21
USB #6, not used
USB #2 to B2
C3
C4
USB #1 to B1
C17
LAN to B3
USB #3, not used
C18
C19
USB #4, not used
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Not used
PCIe x1 slot 7
Not used
PCIe x16 slot 6
UPS Control to B9
C12
PCIe x1 slot 5
Not used
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 3
SCSI for optional MO drive No external connection
C15
PCI slot 2
Not used
PCI slot 1
Back End Processor (BEP) 4
Rev. 4
VIVID 7 BEP2.0 Replacement

Figure 1-11 Label, BEP4 as BEP2 Replacement, Internal Connections (Int.Conn.)

1-5-23 Label, BEP2.2, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor's Cover (inside unit)

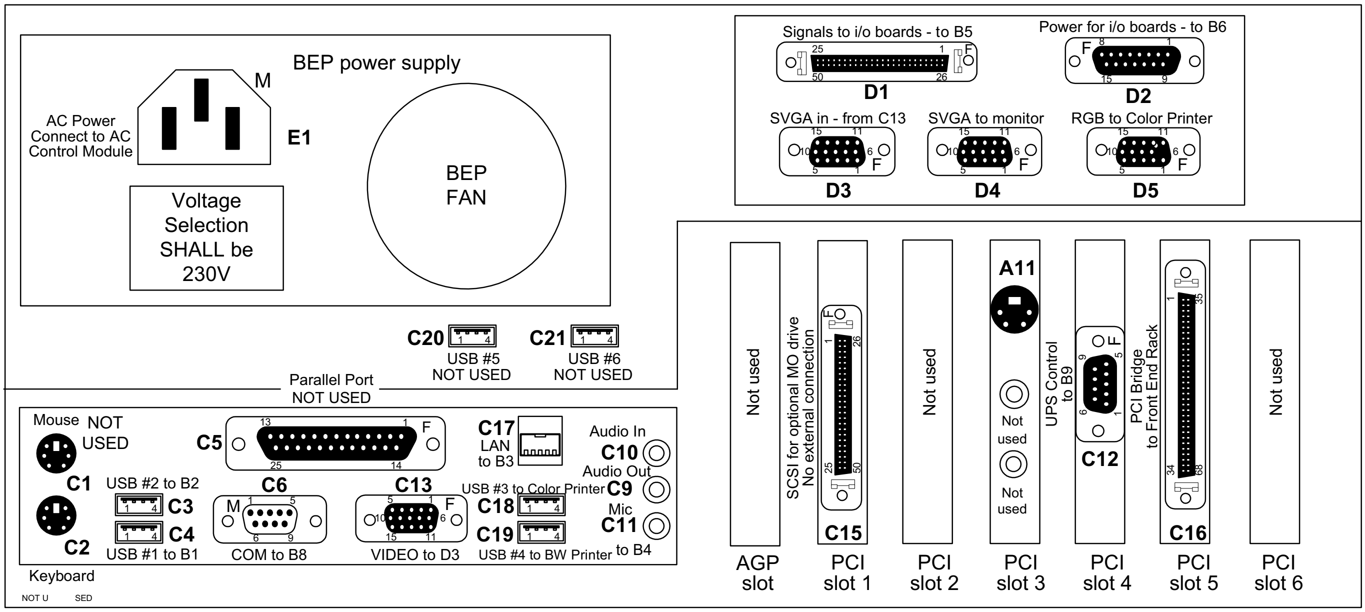
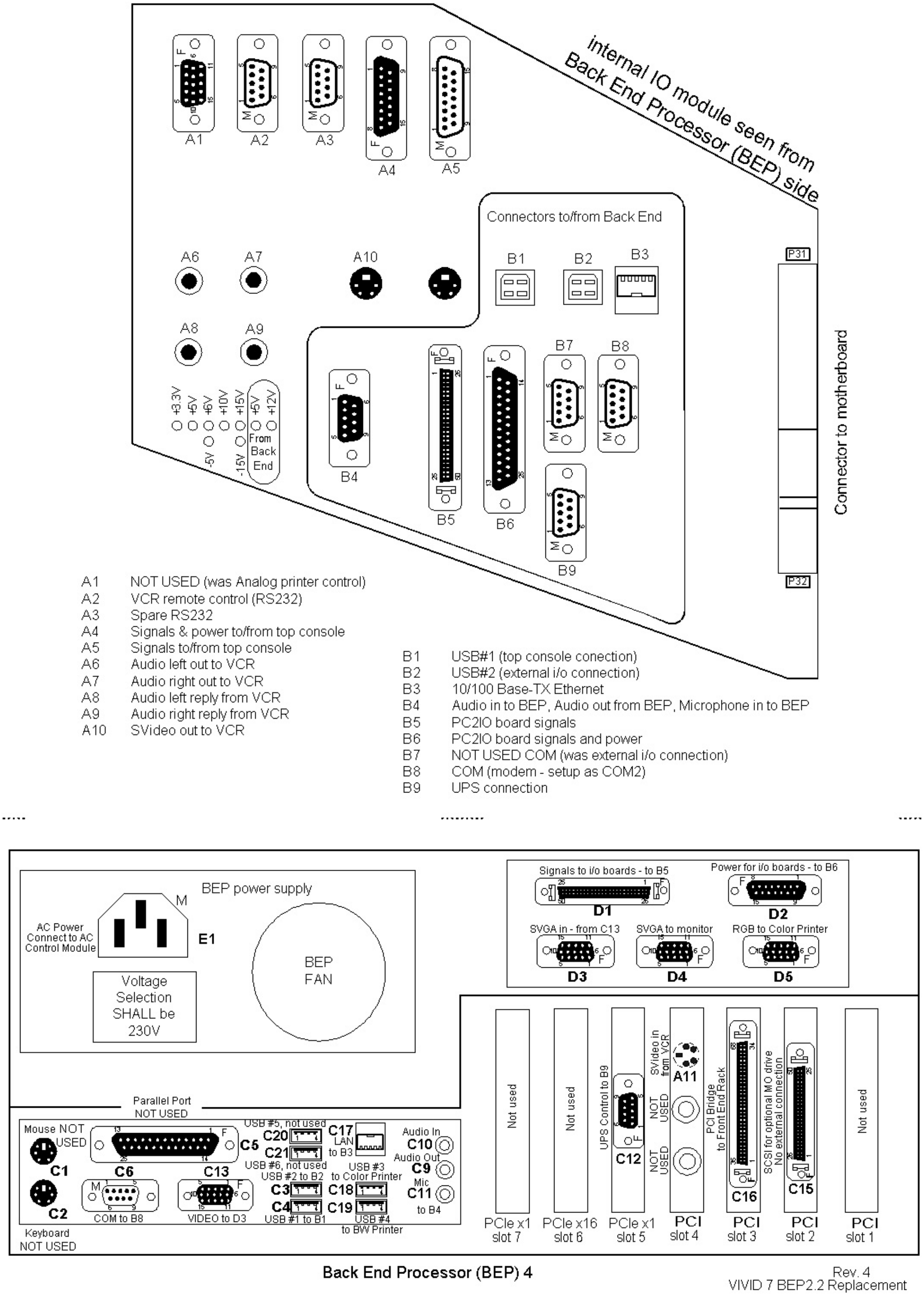

BEP power supply
M
AC Power
Connect to AC
Control Module
E1
Voltage
Selection
SHALL be
230V
BEP
FAN
C20
USB #5
NOT USED
C21
USB #6
NOT USED
Parallel Port
NOT USED
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
SVGA in - from C13
D3
SVGA to monitor
D4
RGB to Color Printer
D5
Mouse NOT USED
C1
C2
Keyboard
NOT USED
USB #2 to B2
C3
C4
USB #1 to B1
C5
C6
COM to B8
C13
VIDEO to D3
C17
LAN
to B3
Audio In
C10
Audio Out
C9
Mic
C11
to B4
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Not used
AGP
slot
SCSI for optional MO drive
No external connection
C15
PCI
slot 1
Not used
PCI
slot 2
A11
Not
used
Not
used
PCI
slot 3
UPS Control
to B9
C12
PCI
slot 4
PCI Bridge
to Front End Rack
C16
PCI
slot 5
Not used
PCI
slot 6

Figure 1-12 Label, BEP2.2, Internal Connections (Int.Conn.)

1-5-24 Label, BEP4 as BEP2.2 Replacement, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor’s Cover (inside Vivid 7)


internal IO module seen from Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
B1
B2
B3
P31
A6
A7
A10
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
B4
B5
B6
B7
B8
B9
Connector to motherboard
P32
BEP power supply
M
AC Power Connect to AC Control Module
E1
Voltage Selection SHALL be 230V
BEP FAN
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
C5
C6
COM to B8
C13
VIDEO to D3
USB #5, not used
C20
C21
USB #6, not used
USB #2 to B2
C3
C4
USB #1 to B1
C17
LAN to B3
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
SVGA in - from C13
D3
SVGA to monitor
D4
RGB to Color Printer
D5
Not used
PCIe x1 slot 7
Not used
PCIe x16 slot 6
UPS Control to B9
C12
PCIe x1 slot 5
SVideo in from VCR
A11
NOT USED
NOT USED
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 3
SCSI for optional MO drive No external connection
C15
PCI slot 2
Not used
PCI slot 1

A1	NOT USED (was Analog printer control)
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	NOT USED COM (was external i/o connection)
B8	COM (modem - setup as COM2)
B9	UPS connection

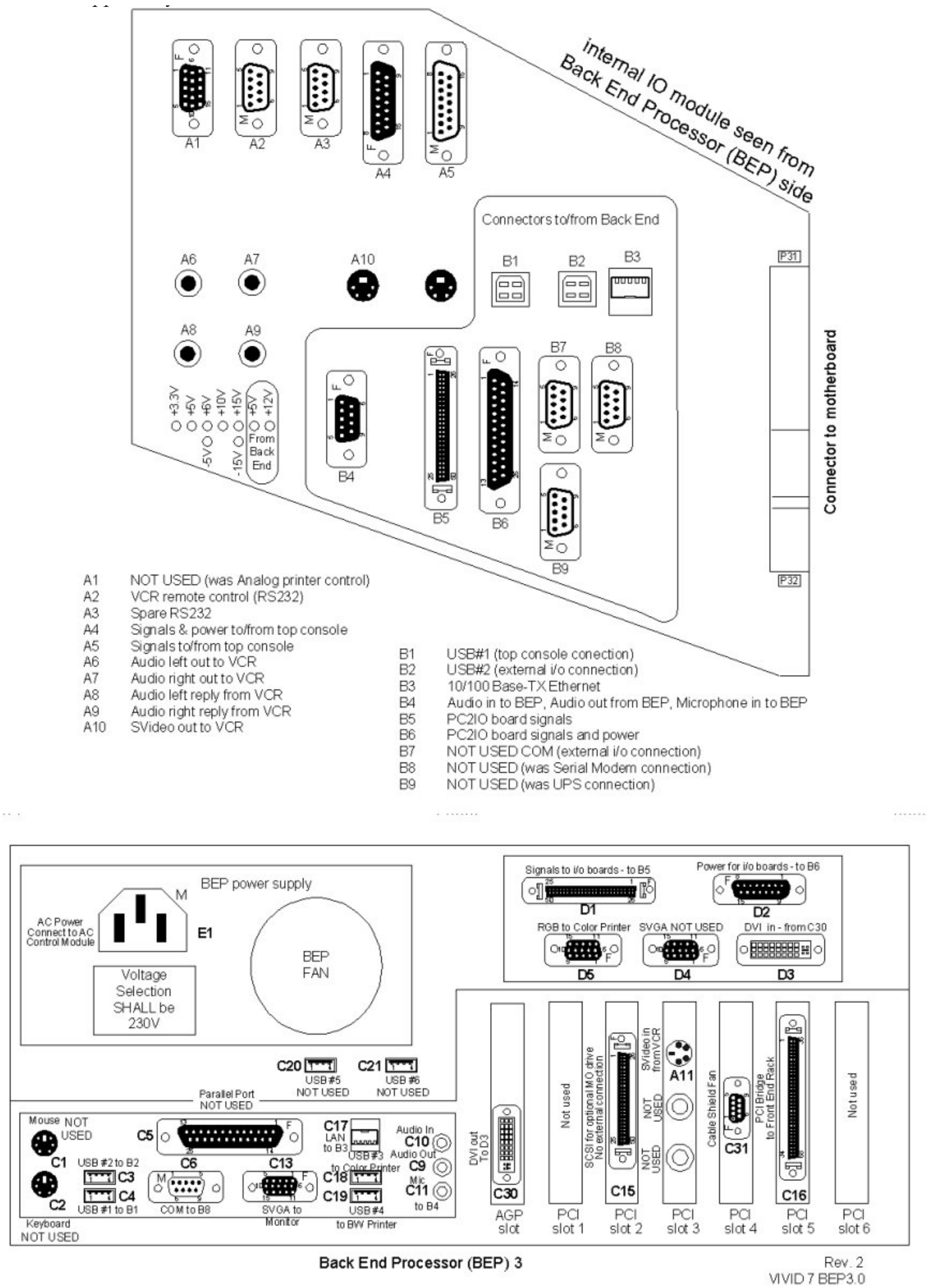
Back End Processor (BEP) 4

Rev. 4
VIVID 7 BEP2.2 Replacement

Figure 1-13 Label, BEP4 as BEP 2-2 replacement, Internal Connections (Int.Conn.)

1-5-25 Label, BEP3.x, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor’s Cover (inside unit).


internal IO module seen from
Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
A6
A7
A10
B1
B2
B3
P31
A8
A9
B7
B8
Connector to motherboard
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From
Back
End
B4
B5
B6
B9
P32
BEP power supply
M
AC Power
Connect to AC
Control Module
E1
Voltage
Selection
SHALL be
230V
BEP
FAN
C20
USB #5
NOT USED
C21
USB #6
NOT USED
Parallel Port
NOT USED
Mouse NOT
USED
C1
C2
Keyboard
NOT USED
USB #2 to B2
C3
C4
USB #1 to B1
C5
C6
COM to B8
C13
SVGA to
Monitor
C17
LAN
to B3
USB #3
to Color Printer
C18
C19
USB #4
to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
RGB to Color Printer
D5
SVGA NOT USED
D4
DVI in - from C30
D3
DVI out
To D3
C30
AGP
slot
Not used
PCI
slot 1
SCSI for optional MO drive
No external connection
C15
PCI
slot 2
SVideo in
from VCR
A11
NOT
USED
NOT
USED
PCI
slot 3
Cable Shield Fan
C31
PCI
slot 4
PCI Bridge
to Front End Rack
C16
PCI
slot 5
Not used
PCI
slot 6
Back End Processor (BEP) 3
Rev. 2
VIVID 7 BEP3.0

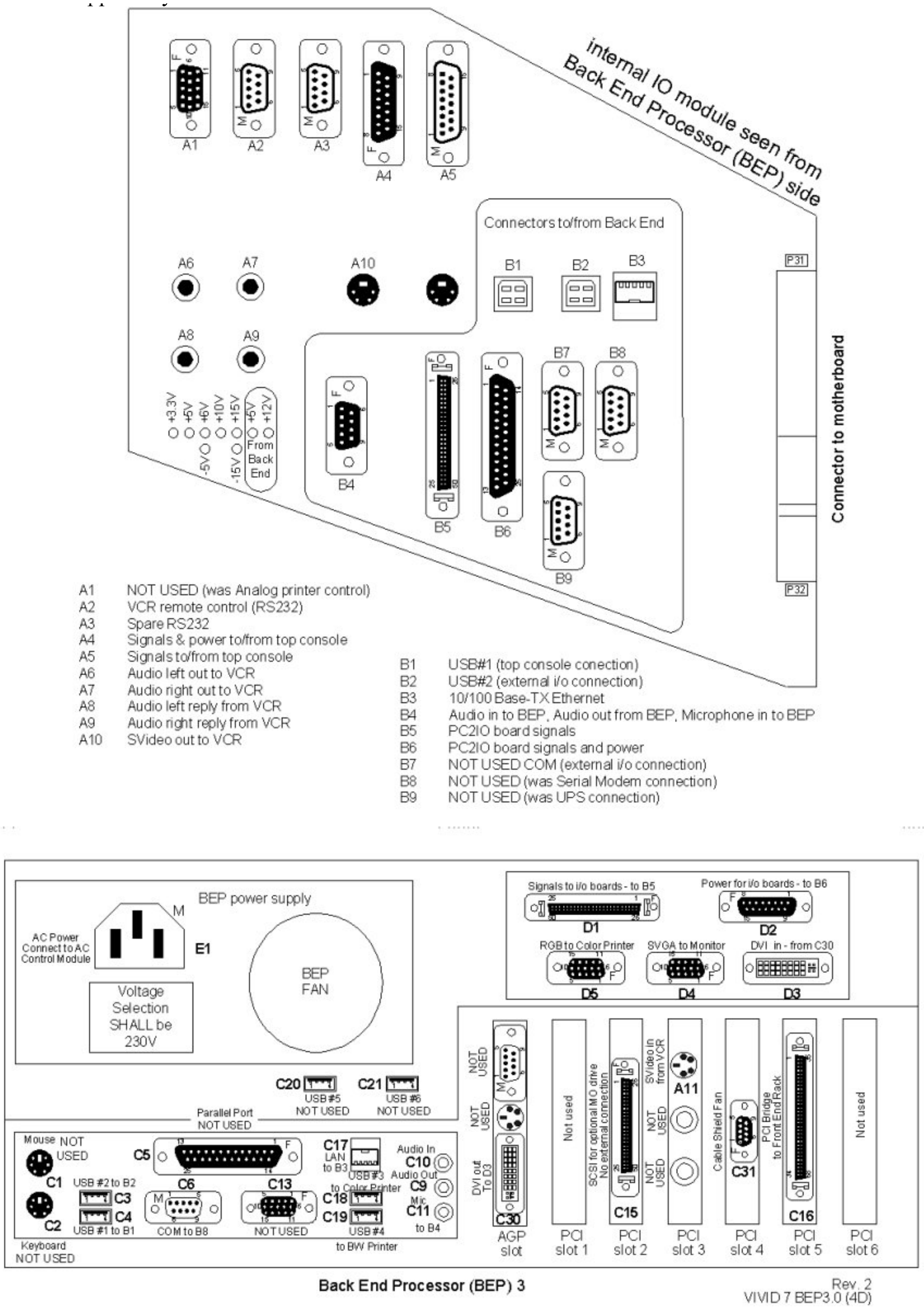
A1	NOT USED (was Analog printer control)
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	NOT USED COM (external i/o connection)
B8	NOT USED (was Serial Modem connection)
B9	NOT USED (was UPS connection)

Figure 1-14 Label, BEP3.x, Internal Connections (Int.Conn.)

1-5-26 Label, BEP3.x with 4D, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor's Cover (inside unit).


Internal IO module seen from Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
B1
B2
B3
P31
A6
A7
A10
A8
A9
B7
B8
Connector to motherboard
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
B4
B5
B6
B9
P32
BEP power supply
AC Power Connect to AC Control Module
M
E1
Voltage Selection SHALL be 230V
BEP FAN
C20
USB #5 NOT USED
C21
USB #6 NOT USED
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
USB #2 to B2
C3
C4
USB #1 to B1
C5
C6
COM to B8
C13
NOT USED
C17
LAN to B3
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
RGB to Color Printer
D5
SVGA to Monitor
D4
DVI in - from C30
D3
NOT USED
NOT USED
DVI out To D3
C30
AGP slot
Not used
PCI slot 1
SCSI for optional MO drive No external connection
C15
PCI slot 2
SVideo In from VCR
A11
NOT USED
NOT USED
PCI slot 3
Cable Shield Fan
C31
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 5
Not used
PCI slot 6
Back End Processor (BEP) 3
Rev. 2
VIVID 7 BEP3.0 (4D)

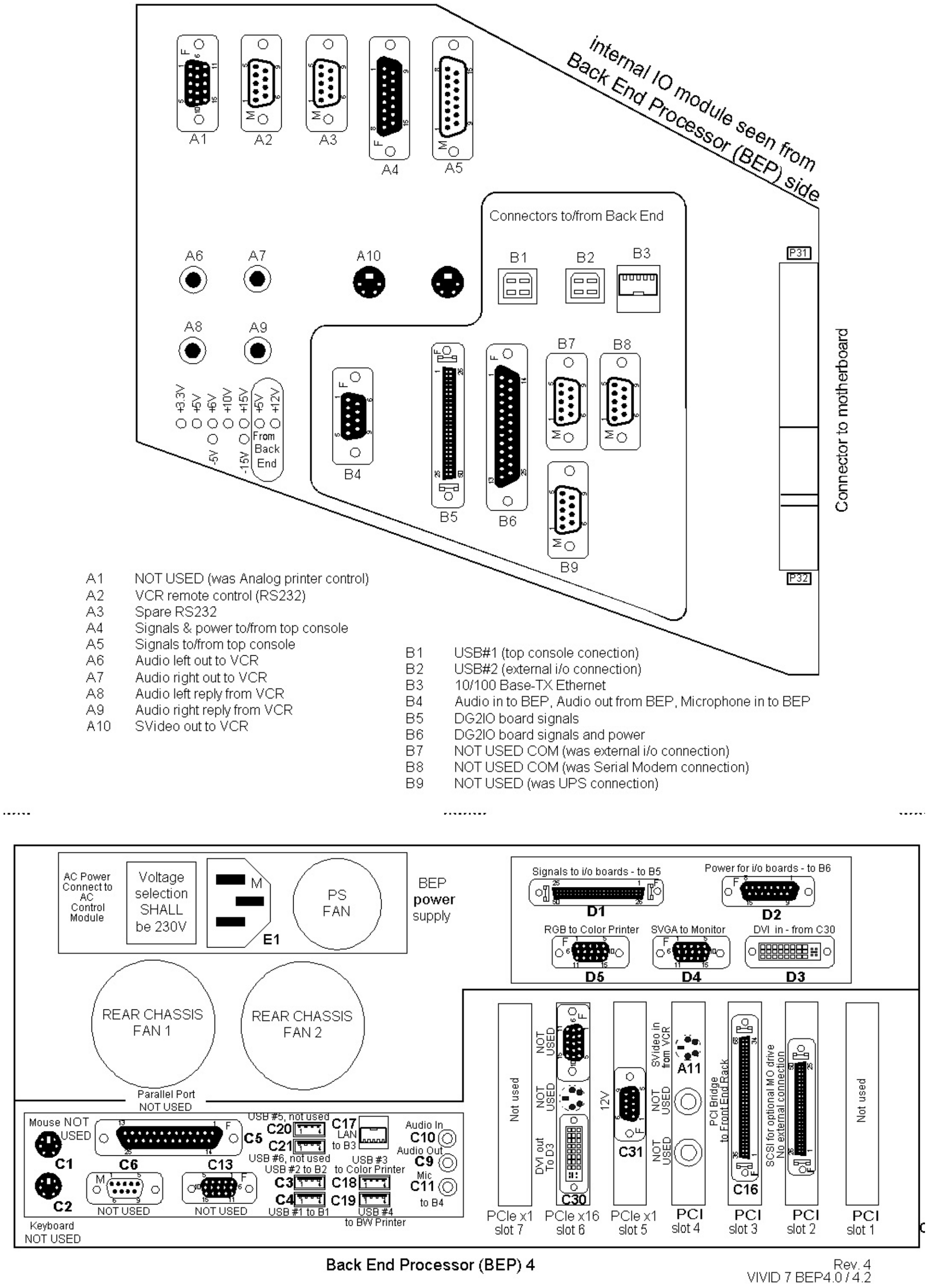
A1	NOT USED (was Analog printer control)
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	NOT USED COM (external i/o connection)
B8	NOT USED (was Serial Modem connection)
B9	NOT USED (was UPS connection)

Figure 1-15 Label, BEP3.x with 4D, Internal Connections (Int.Conn.)

1-5-27 Label, BEP4.x, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor's Cover (inside Vivid 7)



A1	NOT USED (was Analog printer control)
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR

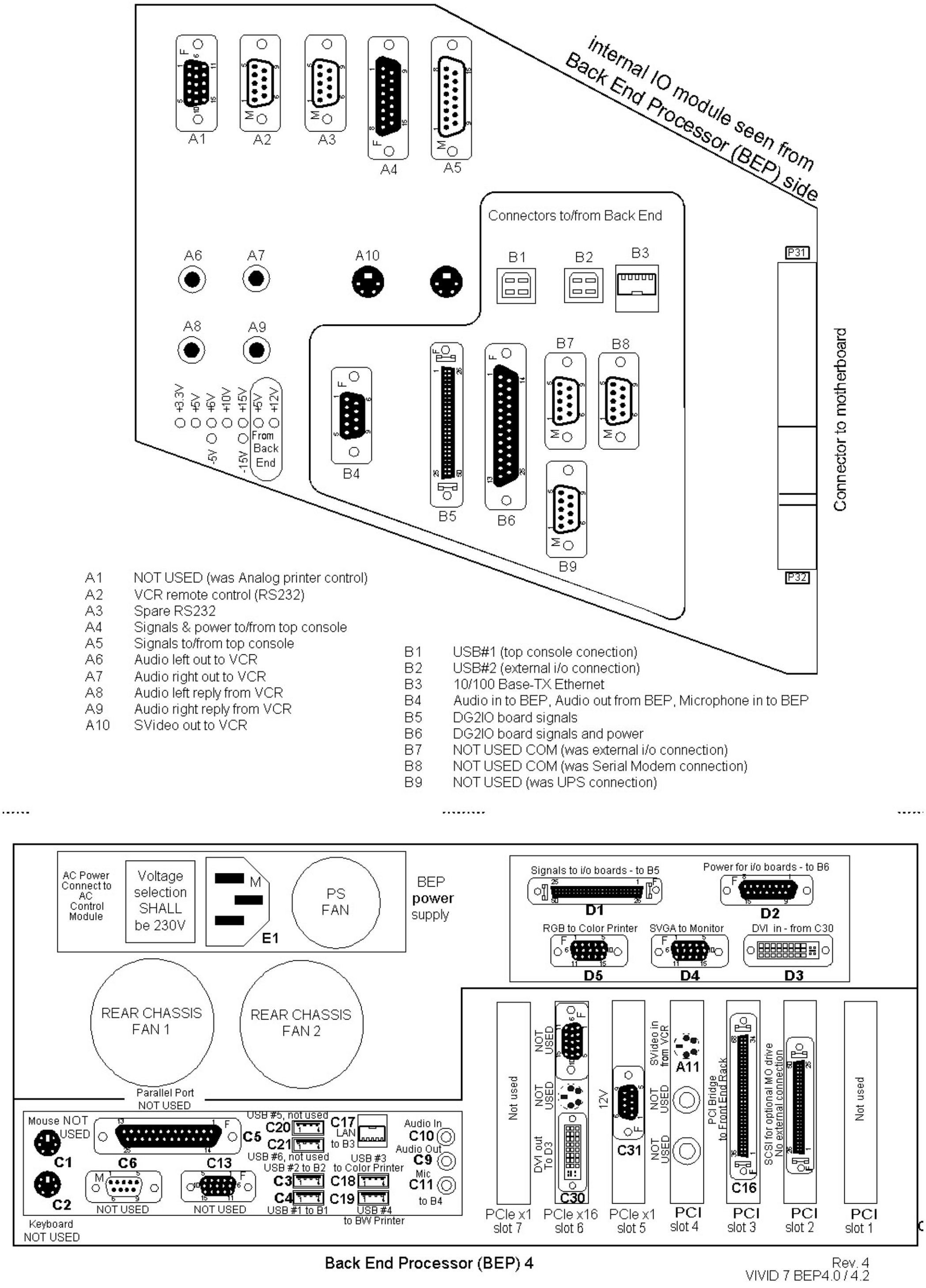
B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	DG2IO board signals
B6	DG2IO board signals and power
B7	NOT USED COM (was external i/o connection)
B8	NOT USED COM (was Serial Modem connection)
B9	NOT USED (was UPS connection)

internal IO module seen from
Back End Processor (BEP) side
A1
A2
A3
A4
A5
Connectors to/from Back End
B1
B2
B3
P31
A6
A7
A10
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
B4
B5
B6
B7
B8
B9
P32
Connector to motherboard
AC Power Connect to AC Control Module
Voltage selection SHALL be 230V
M
E1
PS FAN
BEP power supply
REAR CHASSIS FAN 1
REAR CHASSIS FAN 2
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
C6
NOT USED
C13
NOT USED
C5
USB #5, not used
C20
C21
USB #6, not used
USB #2 to B2
C3
C4
USB #1 to B1
C17
LAN to B3
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
RGB to Color Printer
D5
SVGA to Monitor
D4
DVI in - from C30
D3
Not used
PCIe x1 slot 7
NOT USED
NOT USED
DVI out To D3
C30
PCIe x16 slot 6
12V
C31
PCIe x1 slot 5
SVideo in from VCR
A11
NOT USED
NOT USED
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 3
SCSI for optional MO drive No external connection
PCI slot 2
Not used
PCI slot 1
Back End Processor (BEP) 4
Rev. 4
VIVID 7 BEP4.0 / 4.2

Figure 1-16 Label, BEP4.x, Internal Connections (Int.Conn.)

1-5-28 Label, BEP4.x with 4D, Internal Connections (Int.Conn.)

Located on the outside of the Back-End Processor's Cover (inside Vivid 7)


internal IO module seen from Back End Processor (BEP) side
A1
A2
A3
A4
A5
A6
A7
A10
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
Connectors to/from Back End
B1
B2
B3
B4
B5
B6
B7
B8
B9
P31
P32
Connector to motherboard
AC Power Connect to AC Control Module
Voltage selection SHALL be 230V
E1
PS FAN
BEP power supply
REAR CHASSIS FAN 1
REAR CHASSIS FAN 2
Parallel Port NOT USED
Mouse NOT USED
C1
C2
Keyboard NOT USED
C5
C6
NOT USED
C13
NOT USED
USB #5, not used
C20
C21
USB #6, not used
USB #2 to B2
C3
C4
USB #1 to B1
C17
LAN to B3
USB #3 to Color Printer
C18
C19
USB #4 to BW Printer
Audio In
C10
Audio Out
C9
Mic
C11
to B4
Signals to i/o boards - to B5
D1
Power for i/o boards - to B6
D2
RGB to Color Printer
D5
SVGA to Monitor
D4
DVI in - from C30
D3
Not used
PCIe x1 slot 7
NOT USED
NOT USED
DVI out To D3
C30
PCIe x16 slot 6
12V
C31
PCIe x1 slot 5
SVideo in from VCR
A11
NOT USED
NOT USED
PCI slot 4
PCI Bridge to Front End Rack
C16
PCI slot 3
SCSI for optional MO drive No external connection
PCI slot 2
Not used
PCI slot 1
Back End Processor (BEP) 4
Rev. 4
VIVID 7 BEP4.0 / 4.2

A1	NOT USED (was Analog printer control)
A2	VCR remote control (RS232)
A3	Spare RS232
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR

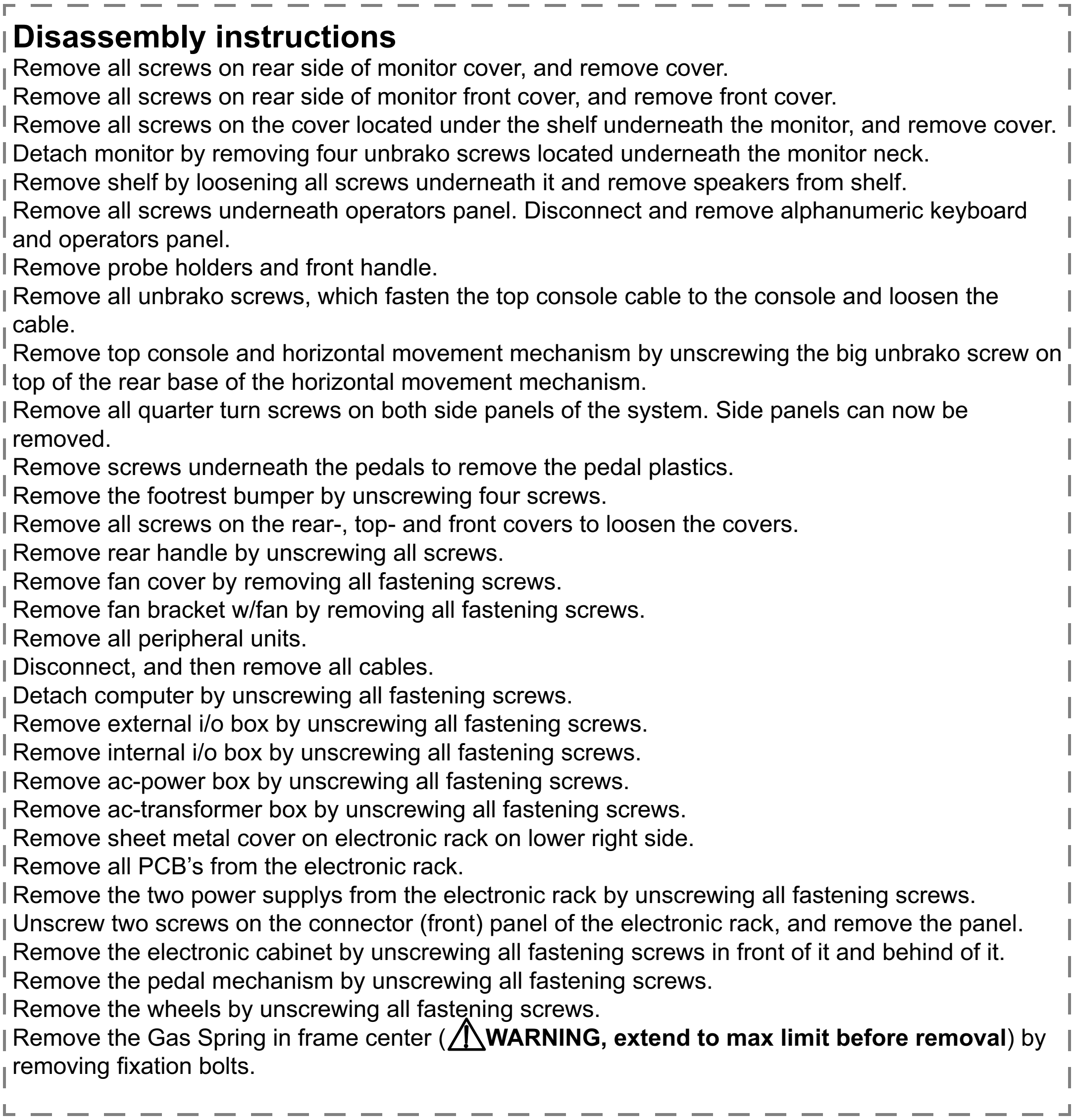
B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	DG2IO board signals
B6	DG2IO board signals and power
B7	NOT USED COM (was external i/o connection)
B8	NOT USED COM (was Serial Modem connection)
B9	NOT USED (was UPS connection)

Figure 1-17 Label, BEP4 with 4D, Internal Connections (Int.Conn.)

1-5-29 Label, Disassembly Nester, Part 1 (Left Part of Label)

Located on the outside of the Front-End Card Rack’s Cover (inside unit).

(Label introduced October 1, 2007)



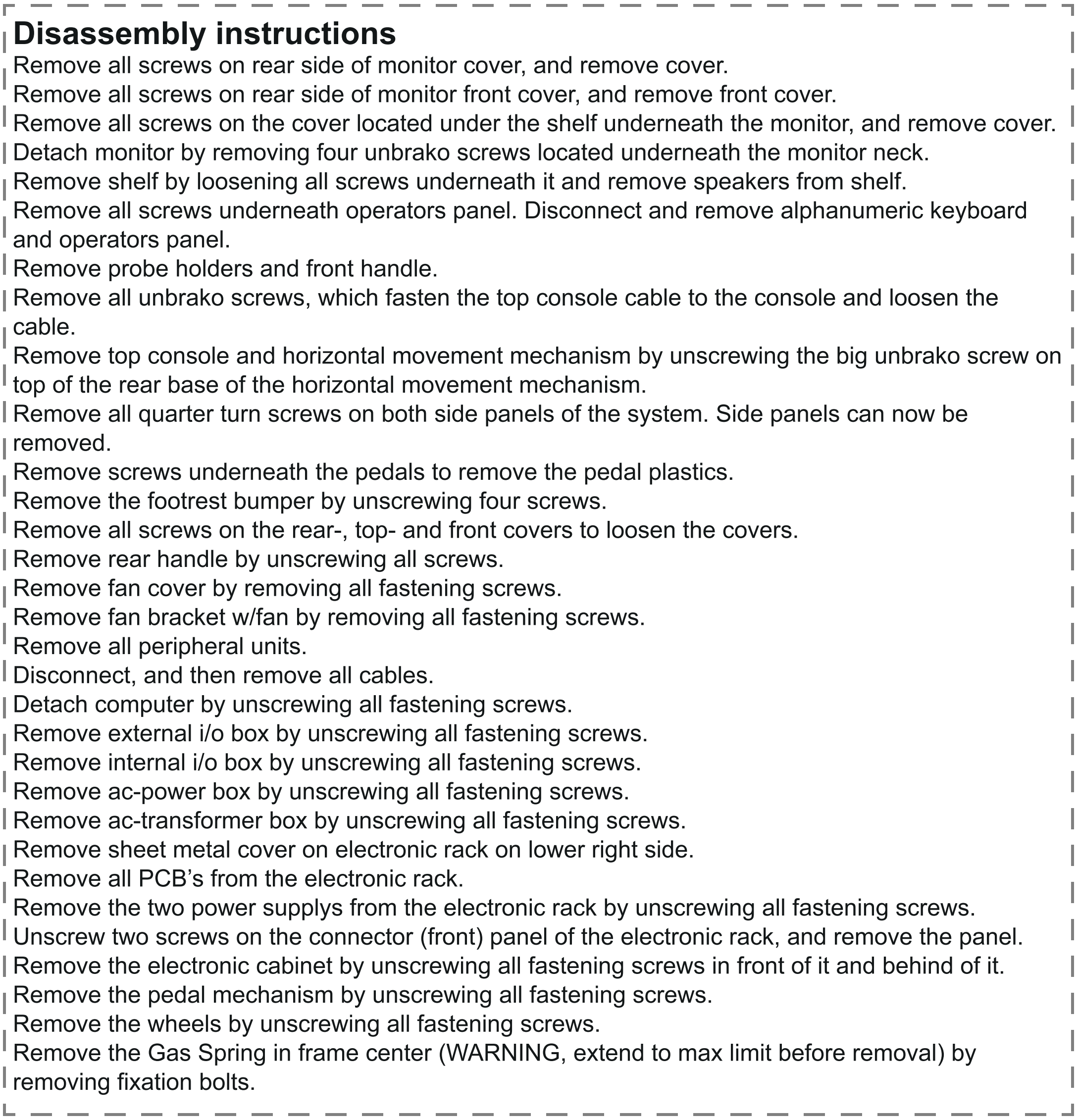
Disassembly instructions

Remove all screws on rear side of monitor cover, and remove cover.
Remove all screws on rear side of monitor front cover, and remove front cover.
Remove all screws on the cover located under the shelf underneath the monitor, and remove cover.
Detach monitor by removing four unbrako screws located underneath the monitor neck.
Remove shelf by loosening all screws underneath it and remove speakers from shelf.
Remove all screws underneath operators panel. Disconnect and remove alphanumeric keyboard and operators panel.
Remove probe holders and front handle.
Remove all unbrako screws, which fasten the top console cable to the console and loosen the cable.
Remove top console and horizontal movement mechanism by unscrewing the big unbrako screw on top of the rear base of the horizontal movement mechanism.
Remove all quarter turn screws on both side panels of the system. Side panels can now be removed.
Remove screws underneath the pedals to remove the pedal plastics.
Remove the footrest bumper by unscrewing four screws.
Remove all screws on the rear-, top- and front covers to loosen the covers.
Remove rear handle by unscrewing all screws.
Remove fan cover by removing all fastening screws.
Remove fan bracket w/fan by removing all fastening screws.
Remove all peripheral units.
Disconnect, and then remove all cables.
Detach computer by unscrewing all fastening screws.
Remove external i/o box by unscrewing all fastening screws.
Remove internal i/o box by unscrewing all fastening screws.
Remove ac-power box by unscrewing all fastening screws.
Remove ac-transformer box by unscrewing all fastening screws.
Remove sheet metal cover on electronic rack on lower right side.
Remove all PCB’s from the electronic rack.
Remove the two power supplys from the electronic rack by unscrewing all fastening screws.
Unscrew two screws on the connector (front) panel of the electronic rack, and remove the panel.
Remove the electronic cabinet by unscrewing all fastening screws in front of it and behind of it.
Remove the pedal mechanism by unscrewing all fastening screws.
Remove the wheels by unscrewing all fastening screws.
Remove the Gas Spring in frame center (⚠**WARNING, extend to max limit before removal**) by removing fixation bolts.

Figure 1-18 Label, Disassembly Nester, Part 1 (Left Part of Label)

1-5-29 Label, Disassembly Nester, Part 1 (Left Part of Label) (cont'd)

(Label introduced September 2005.)



Disassembly instructions

Remove all screws on rear side of monitor cover, and remove cover.
Remove all screws on rear side of monitor front cover, and remove front cover.
Remove all screws on the cover located under the shelf underneath the monitor, and remove cover.
Detach monitor by removing four unbrako screws located underneath the monitor neck.
Remove shelf by loosening all screws underneath it and remove speakers from shelf.
Remove all screws underneath operators panel. Disconnect and remove alphanumeric keyboard and operators panel.
Remove probe holders and front handle.
Remove all unbrako screws, which fasten the top console cable to the console and loosen the cable.
Remove top console and horizontal movement mechanism by unscrewing the big unbrako screw on top of the rear base of the horizontal movement mechanism.
Remove all quarter turn screws on both side panels of the system. Side panels can now be removed.
Remove screws underneath the pedals to remove the pedal plastics.
Remove the footrest bumper by unscrewing four screws.
Remove all screws on the rear-, top- and front covers to loosen the covers.
Remove rear handle by unscrewing all screws.
Remove fan cover by removing all fastening screws.
Remove fan bracket w/fan by removing all fastening screws.
Remove all peripheral units.
Disconnect, and then remove all cables.
Detach computer by unscrewing all fastening screws.
Remove external i/o box by unscrewing all fastening screws.
Remove internal i/o box by unscrewing all fastening screws.
Remove ac-power box by unscrewing all fastening screws.
Remove ac-transformer box by unscrewing all fastening screws.
Remove sheet metal cover on electronic rack on lower right side.
Remove all PCB's from the electronic rack.
Remove the two power supplys from the electronic rack by unscrewing all fastening screws.
Unscrew two screws on the connector (front) panel of the electronic rack, and remove the panel.
Remove the electronic cabinet by unscrewing all fastening screws in front of it and behind of it.
Remove the pedal mechanism by unscrewing all fastening screws.
Remove the wheels by unscrewing all fastening screws.
Remove the Gas Spring in frame center (WARNING, extend to max limit before removal) by removing fixation bolts.

Figure 1-19 Label, Disassembly Nester, Part 1 (Left Part of Label)

1-5-29 Label, Disassembly Nester, Part 1 (Left Part of Label) (cont'd)

(Label used before September 2005.)

DISASSEMBLY INSTRUCTIONS
Remove all screws on rear side of monitor cover, and remove cover.
Remove all screws on rear side of monitor front cover, and remove front cover.
Remove all screws on the cover located under the shelf underneath the monitor, and remove cover.
Detach monitor by removing four unbrako screws located underneath the monitor neck.
Remove shelf by loosening all screws underneath it and remove speakers from shelf.
Remove all screws underneath operators panel. Disconnect and remove alphanumeric keyboard and operators panel.
Remove probe holders and front handle.
Remove all unbrako screws, which fasten the top console cable to the console and loosen the cable.
Remove top console and horizontal movement mechanism by unscrewing the big unbrako screw on top of the rear base of the horizontal movement mechanism.
Remove all quarterturn screws on both sidepanels of the system. Side panels can now be removed.
Remove screws underneath the pedals to remove the pedal plastics.
Remove the footrest bumper by unscrewing four screws.
Remove all screws on the rear-, top- and front covers to loosen the covers.
Remove rear handle by unscrewing all screws.
Remove fan cover by removing all fastening screws.
Remove fan bracket w/fan by removing all fastening screws.
Remove all peripheral units.
Disconnect, then remove all cables.
Detach computer by unscrewing all fastening screws.
Remove external i/o box by unscrewing all fastening screws.
Remove internal i/o box by unscrewing all fastening screws.
Remove ac-power box by unscrewing all fastening screws.
Remove ac-transformer box by unscrewing all fastening screws.
Remove sheet metal cover on electronic rack on lower right side.
Remove all PCB's from the electronic rack.
Remove the two power supplys from the electronic rack by unscrewing all fastening screws.
Unscrew two screws on the connector (front) panel of the electronic rack, and remove the panel.
Remove the electronic cabinet by unscrewing all fastening screws in front of it and behind of it.
Remove the pedal mechanism by unscrewing all fastening screws.
Remove the wheels by unscrewing all fastening screws.

Figure 1-20 Label, Disassembly Instruction, Part 1 (Left Part of Label)

1-5-30 Label, Disassembly Nester, Part 2 (Right Part of Label)

Located on the outside of the Front-End Card Rack’s Cover (inside unit)

(Label introduced October 1, 2007)

FB314971-04

	Special items/material	Location information
1	Lithium	BEP battery
2	Lead	BEP standby battery (option)
3	Printed circuit boards	Circuit boards inside all sub units
4	LCD	Main LCD on the system
5	External electric cables	Part of the trolley
6	Electrolyte capacitors	Inside BEP-, AC-, DC- and TX power
7	Nitrogen filled gass spring	User Interface locking system
8	Cathode ray tubes	Main CRT on the system

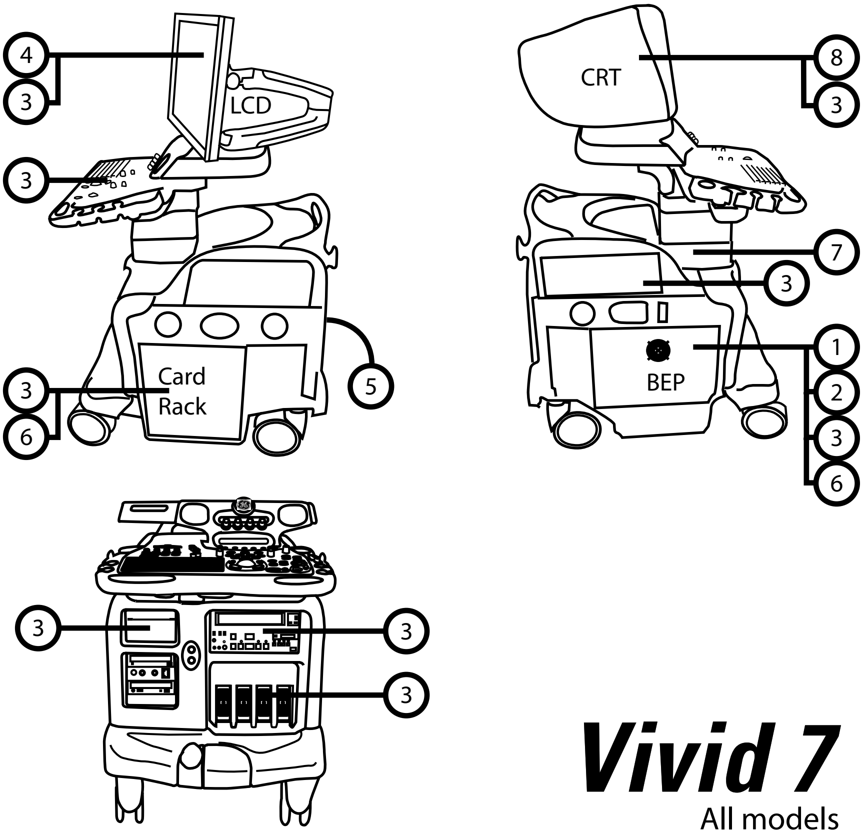


Figure 1-21 Label, Disassembly Instruction, Part 2 (Right Part of Label)

1-5-30 Label, Disassembly Nester, Part 2 (Right Part of Label) (cont'd)

(Label introduced September 2005)

	Special items/material	Location information
1	Lithium	BEP battery
2	Lead	BEP standby battery (option)
3	printed circuit boards	Circuit boards inside all sub units
4	cathode ray tubes	Main CRT on the system
5	external electric cables	Part of the trolly
6	electrolyte capacitors	Inside BEP-, AC-, DC- and TX power
7	Nitrogen filled gass spring	User Interface locking system

FB314971-03

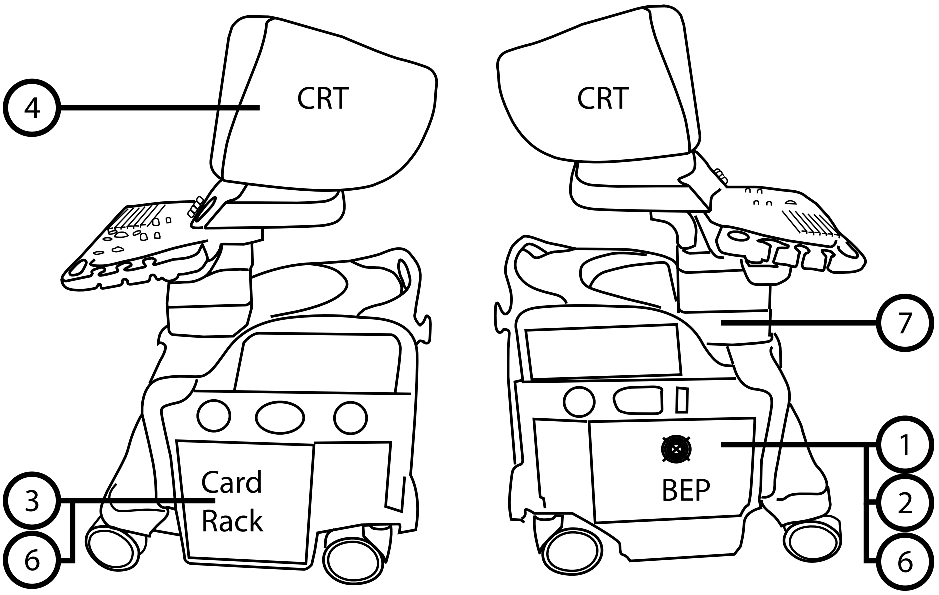
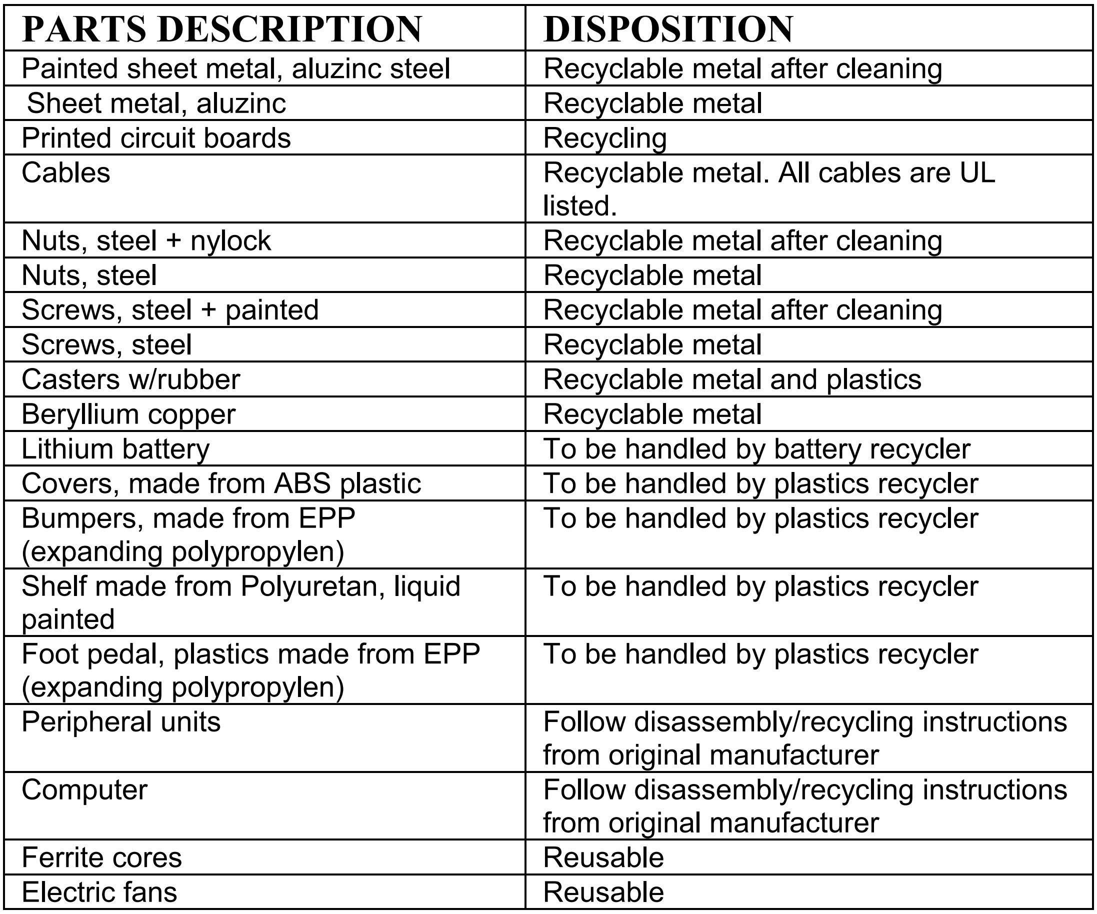


Figure 1-22 Label, Disassembly Instruction, Part 2 (Right Part of Label)

1-5-30 Label, Disassembly Nester, Part 2 (Right Part of Label) (cont’d)

(Label used before 2005)



PARTS DESCRIPTION	DISPOSITION
Painted sheet metal, aluzinc steel	Recyclable metal after cleaning
Sheet metal, aluzinc	Recyclable metal
Printed circuit boards	Recycling
Cables	Recyclable metal. All cables are UL listed.
Nuts, steel + nylock	Recyclable metal after cleaning
Nuts, steel	Recyclable metal
Screws, steel + painted	Recyclable metal after cleaning
Screws, steel	Recyclable metal
Casters w/rubber	Recyclable metal and plastics
Beryllium copper	Recyclable metal
Lithium battery	To be handled by battery recycler
Covers, made from ABS plastic	To be handled by plastics recycler
Bumpers, made from EPP (expanding polypropylen)	To be handled by plastics recycler
Shelf made from Polyuretan, liquid painted	To be handled by plastics recycler
Foot pedal, plastics made from EPP (expanding polypropylen)	To be handled by plastics recycler
Peripheral units	Follow disassembly/recycling instructions from original manufacturer
Computer	Follow disassembly/recycling instructions from original manufacturer
Ferrite cores	Reusable
Electric fans	Reusable

Figure 1-23 Label, Disassembly Instruction, Part 2 (Right Part of Label)

Section 1-6
Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

WARNING ***IF THE COVERS ARE REMOVED FROM AN OPERATING Vivid 7, SOME METAL SURFACES MAY BE WARM ENOUGH TO POSE A POTENTIAL HEAT HAZARD IF TOUCHED, EVEN WHILE IN SHUT DOWN MODE.***

WARNING ***EXPLOSION WARNING***

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE. OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

WARNING ***DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT.***

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

Section 1-7
Lockout/Tagout (LOTO) Requirements

Follow OSHA Lockout/Tagout requirements (USA) or local Lockout/Tagout requirements by ensuring you are in total control of the AC power plug at all times during the service process.

To apply Lockout/Tagout:

1.) Plan and prepare for shutdown.
2.) Shutdown the equipment.
3.) Isolate the equipment.
4.) Apply Lockout/Tagout Devices.
5.) Control all stored and residual energy.
6.) Verify isolation.

All potentially hazardous stored or residual energy is relieved.

NOTICE Energy Control and Power Lockout for Vivid 7.
When servicing parts of the system where there is exposure to voltage greater than 30 Volts:

TAG
&
LOCKOUT

1.) Turn off the breaker.
2.) Unplug the system.
3.) Maintain control of the system power plug.
4.) Wait for at least 20 seconds for capacitors to discharge as there are no test points to verify isolation.
Beware that the AC Control Box, Front End Processor and Back End Processor may be energized even if the power is turned off when the cord is still plugged into the AC Outlet.

Section 1-8
Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEHC policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEHC employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe). The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purposes and must be transported as a hazardous material.

Section 1-9
Electromagnetic Compatibility (EMC)

1-9-1 What is EMC?

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due interference from its environment or when the device produces unacceptable levels of emission to its environment. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power of signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-9-2 Compliance

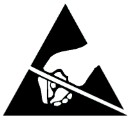
Vivid 7 conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

Applicable standards are: 47CFR Part 18, IEC60601–1–2:2001.

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh, clamps, are in good condition, installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-9-3 Electrostatic Discharge (ESD) Prevention

WARNING ***DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:***



ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED AT THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

Section 1-10
Customer Assistance

1-10-1 Contact Information

If this equipment does not work as indicated in this service manual or in the user manual, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Before you call, identify the following information, and acquire image (Alt+D) to send to the Customer Care team:

1.) System ID serial number.
2.) Software version.
3.) Date and time of occurrence.
4.) Sequence of events leading to issue.
5.) Is the issue reproduceable?
6.) Imaging mode, probe, preset/application.
7.) Media brand, speed, capacity, type.
8.) Save secondary image capture, cine loop, 4D multi-volume loop.

NOTE: Restart the application before resuming clinical scanning.

Table 1-24 Phone numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Healthcare Ultrasound Service Engineering 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site Service Parts Application Support	1-800-437-1171 1-800-558-2040 1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Application Support	1-800-321-7937 1-262-524-5698
Europe GE Ultraschall Deutscland Gmbh & Co. KG Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	Phone: +33 (0) 130-831-300 (General Imaging and Cardiac) +43 (0) 7682-3800-26 (Voluson-Logiqbook) Fax: +49 (0) 2122-8024-31	
Asia (Singapore) GE Ultrasound Asia Service Department - Ultrasound 298 Tiong Bahru Road #15-01/06 Central Placa Singapore 168730	Tel: +65 6291-8528 Fax: +65 6291-7006	
Japan Support Center	Phone: 81-426-48-2940 Fax: 81-426-48-2905	

1-10-2 System Manufacturer

Table 1-25 System Manufacturer

MANUFACTURER	PHONE NUMBER	FAX NUMBER
GE Vingmed Ultrasound A/S Strandpromenaden 45 P.O. Box 141 N-3191 HORTEN NORWAY	+47 3302 1100	+47 3302 1350

Chapter 2
Site Preparations

Section 2-1
Overview

2-1-1 Purpose of Chapter 2

This chapter provides the information required to plan and prepare for the installation of a Vivid 7. Included are descriptions of the facility and electrical needs to be met by the purchaser of the unit.

2-1-2 Contents in Chapter 2

Table 2-1 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	General Console Requirements	2-2
2-3	Facility Needs	2-10

Section 2-2
General Console Requirements

2-2-1 Console Environmental Requirements

2-2-1-1 If the unit is very cold or hot

CAUTION **If the unit is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.**

Table 2-2 Vivid 7 Acclimate Time

	DON'T STORE AT THESE TEMPERATURES				KEEP STORAGE TEMPERATURE WITHIN THESE LIMITS																
°C	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60
°F	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122	131	140
Hrs	20	18	16	14	12	10	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8

2-2-1-2 Environmental specifications

Table 2-3 Environmental Specifications for Vivid 7 Scanners

Operating temperature	Storage temperature	Humidity	Heat dissipation
10 to 35 °C (50 to 95 °F)	-20 to 60 °C (-4 to 140 °F)	< 90% rH non-condensing	3500 BTU pr hour

2-2-1-3 Cooling

The cooling requirement for the Vivid 7 is 3500 BTU/hr. This figure does not include cooling needed for lights, people, or other equipment in the room. Each person in the room places an additional 300 BTU/hr. demand on the cooling system.

2-2-1-4 Lighting

Bright light is needed for system installation, updates and repairs. However, operator and patient comfort may be optimized if the room light is subdued and indirect. Therefore a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and dimmers can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interference.

2-2-2 Electrical Requirements

2-2-2-1 General Requirements

NOTE: *GE Medical Systems requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.*

Sites with a mains power system with defined Neutral and Live:
The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:
The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

2-2-2-2 Electrical Requirements for Vivid 7 Dimension, Vivid 7 and Vivid 7 PRO

Electrical Specifications for Vivid 7 and Vivid 7 PRO. Monitor and on board peripherals are included.

Table 2-4 Electrical Specifications for Vivid 7 sheet 1 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FD000010	VIVID 7 DIMENSION CONSOLE, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000020	VIVID 7 DIMENSION CONSOLE, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000120	VIVID 7 PRO CONSOLE, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000130	VIVID 7 PRO CONSOLE, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000140	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000150	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000160	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000170	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000180	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000190	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FC000890	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000900	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000910	VIVID 7 DIMENSION (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000920	VIVID 7 DIMENSION (BT'06) 100-120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000930	VIVID 7 PRO (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000940	VIVID 7 PRO (BT'06) 100-120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000950	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz

Table 2-4 Electrical Specifications for Vivid 7 (cont'd) sheet 2 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FC000960	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000970	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000980	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000760	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME	230 VAC	±10%	5 A	50-60 Hz
FC000770	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME	110-120 VAC	±10%	10 A	50-60 Hz
FC000780	VIVID 7 DIMENSION	230 VAC	±10%	5 A	50-60 Hz
FC000790	VIVID 7 DIMENSION	100-120 VAC	±10%	10 A	50-60 Hz
FC000800	VIVID 7 PRO (BT'05),	230 VAC	±10%	5 A	50-60 Hz
FC000810	VIVID 7 PRO (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000820	VIVID 7 DIMENSION MULTI-DIMENSIONAL IMAGING (BT'05)	230 VAC	±10%	5 A	50-60 Hz
FC000830	VIVID 7 DIMENSION MULTI-DIMENSIONAL IMAGING (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000840	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05)	230 VAC	±10%	5 A	50-60 Hz
FC000850	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000699	Vivid 7 (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000660	Vivid 7 PRO (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000650	Vivid 7 PRO (BT '04)	230 VAC	±10%	5 A	50-60 Hz
FC000640	Vivid 7 Dimension (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000630	Vivid 7 Dimension (BT '04)	230 VAC	±10%	5 A	50-60 Hz
FC000620	Vivid 7 Dimension with 4D (BT'04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000610	Vivid 7 Dimension with 4D (BT'04)	230 VAC	±10%	5 A	50-60 Hz
FC000440	Vivid 7 PRO with RFI	100-120 VAC	±10%	10 A	50-60 Hz
FC000430	Vivid 7 PRO with RFI	230 VAC	±10%	5 A	50-60 Hz
FC000420	Vivid 7 with RFI	100-120 VAC	±10%	10 A	50-60 Hz
FC000410	Vivid 7 with RFI	230 VAC	±10%	5 A	50-60 Hz
FC000340	Vivid 7 PRO (BT '03)	100-120 VAC	±10%	10 A	50-60 Hz
FC000330	Vivid 7 PRO (BT '03)	230 VAC	±10%	5 A	50-60 Hz
FC000320	Vivid 7 (BT '03)	100-120 VAC	±10%	10 A	50-60 Hz
FC000310	Vivid 7 (BT '03)	230 VAC	±10%	5 A	50-60 Hz

Table 2-4 Electrical Specifications for Vivid 7 (cont'd) sheet 3 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FC000210	Vivid 7 (BT '02)	100-120 VAC	±10%	10 A	50-60 Hz
FC000200	Vivid 7 (BT '02)	230 VAC	±10%	5 A	50-60 Hz
FC000190	Vivid 7 PRO (BT '02)	100-120 VAC	±10%	10 A	50-60 Hz
FC000180	Vivid 7 PRO (BT '02)	230 VAC	±10%	5 A	50-60 Hz
FC000060	Vivid 7 (BT '01)	100-120 VAC	±10%	10 A	50-60 Hz
FC000030	Vivid 7 (BT '01)	230 VAC	±10%	5 A	50-60 Hz

2-2-2-3 Inrush Current

Inrush current is not a factor to consider due to the inrush current limiting properties of the power supplies.

Maximum inrush current at startup:

- 230 VAC: 12 A
- 120 VAC: 7 A

2-2-2-4 Site Circuit Breaker

⚠ **CAUTION** **POWER OUTAGE MAY OCCUR. The Vivid 7 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.**

It is recommended that the branch circuit breaker for the unit be readily accessible.

2-2-2-5 Site Power Outlets

A dedicated AC power outlet must be within reach of the unit without extension cords. Other outlets adequate for the external peripherals, medical and test equipment needed to support this unit must also be present within 1 m (3.2 ft.) of the unit. Electrical installation must meet all current local, state, and national electrical codes.

2-2-2-6 Unit Power Plug

If the unit arrives without a power plug, or with the wrong plug, you must contact your GE dealer or the installation engineer must supply what is locally required.

2-2-2-7 Power Stability Requirements

Voltage drop-out

Max 10 ms.

Power Transients

(All applications)

Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-3 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. They also generate EMI. The Vivid 7 complies with limits as stated on the EMC label. However there is no guarantee that interference will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. These sources include:

- medical lasers,
- scanners,
- cauterizing guns,
- computers,
- monitors,
- fans,
- gel warmers,
- microwave ovens,
- light dimmers
- portable phones.

The presence of a broadcast station or broadcast van may also cause interference.

See Table 2-5 on page 2-8 for EMI Prevention tips.

2-2-3 EMI Limitations (cont'd).

Table 2-5 EMI Prevention/abatement

EMI Rule	Details
Be aware of RF sources	Keep the unit at least 5 meters or 15 feet away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the unit	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, RF gaskets, covers, cores	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the Card Rack cover over the Card Rack. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn on the unit until any loose metallic part is removed.
Do not place labels where RF gaskets touch metal	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. Or, if a label has been found in such a position, move the label.
Use GE specified harnesses and peripherals	The interconnect cables are grounded and require ferrite beads and other shielding. Also, cable length, material, and routing are all important; do not change from what is specified.
Take care with cellular phones	Cellular phones may transmit a 5 V/m signal; that could cause image artifacts.
Properly dress peripheral cables	Do not allow cables to lie across the top of the Card Rack or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

2-2-4 Probes Environmental Requirements

Table 2-6 Operation and Storage Temperatures for Probes.

	Electronic	PAMPTE
Operation:	10 to 40 ^{o}C (50 to 104 ^{o}F)	5 to 42.7 ^{o}C (41 to 108,9 ^{o}F)
Storage:	-20 to 50 ^{o}C (-4 to 122 ^{o}F)	-20 to 60 ^{o}C (-4 to 140 ^{o}F)
Temperatures in degrees Celsius (^{o}C) conversion to degrees F: (^{o}F) = (^{o}C * 9/5) + 32		

CAUTION **Systems and PAMPTE probes are designed for storage temperatures of -20 ^{o}C to + 60 ^{o}C (-4 ^{o}F to +140 ^{o}F).**

Electronic probes are designed for storage temperatures of -20 ^{o}C to + 50 ^{o}C (-4 ^{o}F to +122 ^{o}F). When exposed to large temperature variations, the product should be kept at room temperature the needed time to stabilize its temperature before use.
Refer to Table 2-2 "Vivid 7 Acclimate Time" on page 2-2 to determine the needed settlement time.

2-2-5 Time and Manpower Requirements

Site preparation takes time. Begin Pre-installation checks as soon as possible, if possible, six weeks before delivery, to allow enough time to make any changes.

CAUTION

The Vivid 7 weighs at least 190 kg (419 lbs.) when ready to use, depending on installed monitors and peripherals. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.

ALWAYS:

Be sure the pathway is clear. Use slow, careful motions.Use two people when moving on inclines or lifting more than 16 kg (35 lbs).

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre installation work before delivery. Purchaser responsibility includes:

- Procuring the materials required.
- Completing the preparations before delivery of the ultrasound system.
- Paying the costs for any alterations and modifications not specifically provided in the sales contract.

NOTE: All electrical installations that are preliminary to the positioning of the equipment at the site prepared for the equipment must be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must only utilize qualified personnel to perform electrical servicing on the equipment.

The desire to use a non–listed or customer provided product or to place an approved product further from the system than the interface kit allows, presents challenges to the installation team. To avoid delays during installation, such variances should be made known to the individuals or group performing the installation at the earliest possible date (preferably prior to the purchase).

The ultrasound suite must be clean prior to delivery of the machine. Carpet is not recommended because it collects dust and creates static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Required Facility Needs

NOTE: *GE Healthcare requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.*

Sites with a mains power system with defined Neutral and Live:
The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:
The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

NOTE: *Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.*

- Dedicated single branch power outlet of adequate amperage (see Table 2-4 on page 2-4) meeting all local and national codes which is located less than 2.5 m (8 ft.) from the unit's proposed location
- Door opening is at least 76 cm (30 in) wide
- Proposed location for unit is at least 0.3 m (1 ft.) from the wall for cooling
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.

NOTE: *The Vivid 7 has four outlets inside the unit. One is for the monitor and three for on board peripherals.*

- Power outlets for other medical equipment and gel warmer
- Power outlets for test equipment within 1 m (3.2 ft.) of unit
- Clean and protected space to store transducers (in their cases or on a rack)
- Material to safely clean probes (done with a plastic container, never metal)

2-3-3 Desirable Features

- Door is at least 92 cm (3 ft.) wide
- Circuit breaker for dedicated power outlet is easily accessible
- Sink with hot and cold water
- Receptacle for bio–hazardous waste, like used probe sheaths
- Emergency oxygen supply
- Storage for linens and equipment
- Nearby waiting room, lavatory, and dressing room
- Dual level lighting (bright and dim)
- Lockable cabinet ordered by GE for its software and proprietary manuals

2-3-4 Minimal Floor Plan Suggestion

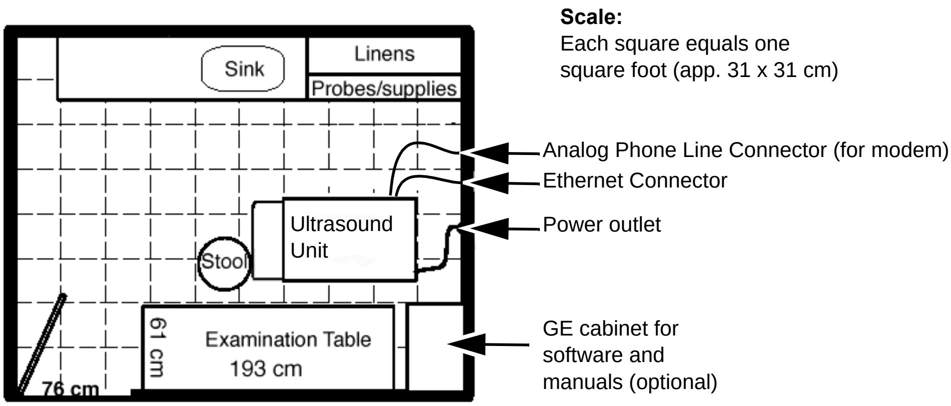

Scale:
Each square equals one square foot (app. 31 x 31 cm)
Sink
Linens
Probes/supplies
Analog Phone Line Connector (for modem)
Ethernet Connector
Ultrasound Unit
Power outlet
Stool
61 cm
Examination Table
193 cm
76 cm
GE cabinet for software and manuals (optional)

Figure 2-1 Minimal Floor Plan, 2.5m x 3m (8 by 10 foot)

2-3-5 Networking Setup Requirements

2-3-5-1 Stand Alone Scanner (without Network Connection)

None.

2-3-5-2 Scanner Connected to Hospital's Network

Supported networks:

DICOM Network (option)

2-3-5-3 Purpose of the DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

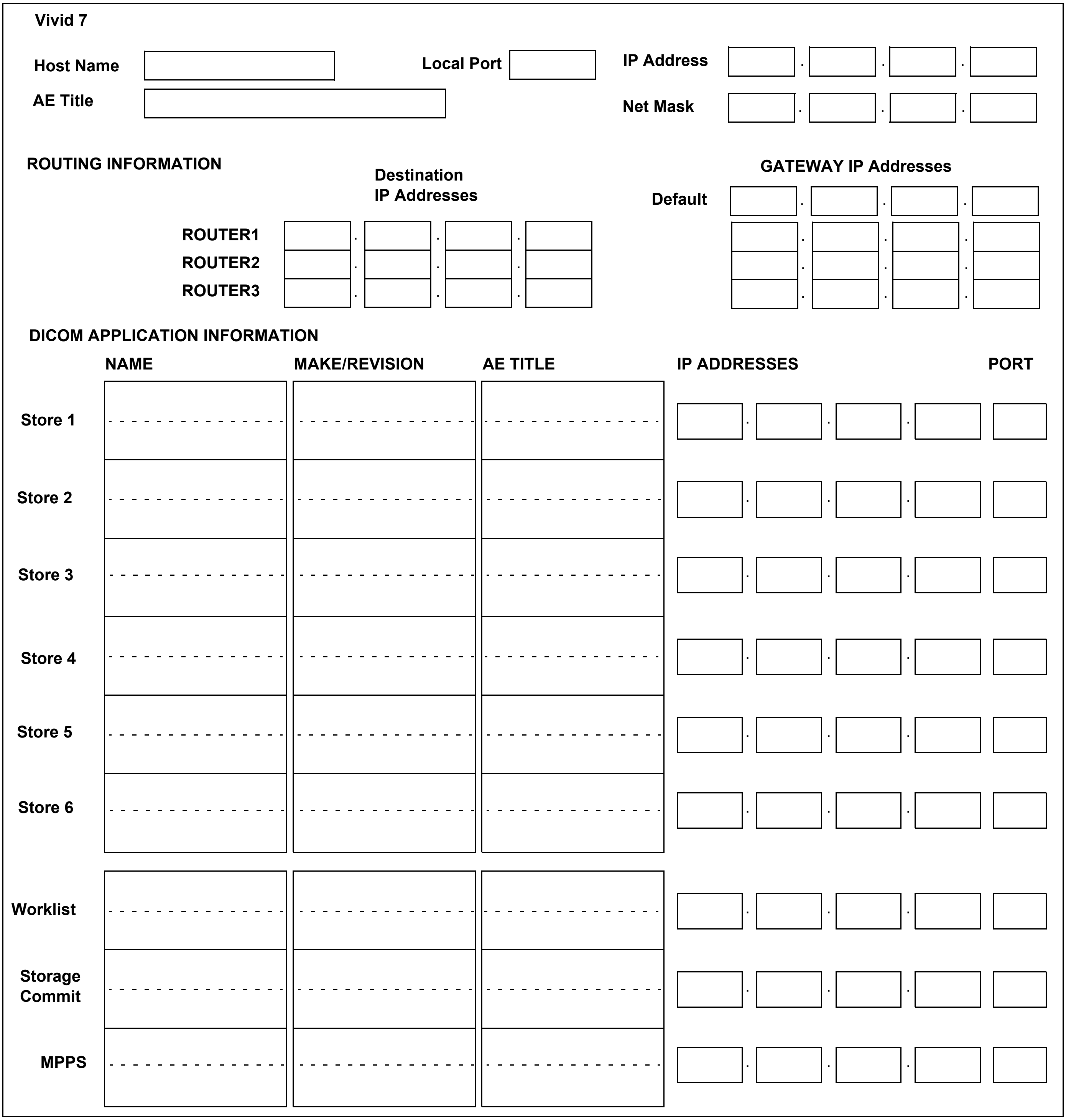
2-3-5-4 DICOM Option Setup Requirements

To configure the Vivid 7 to work with other network connections, the site's network administrator must provide information to complete the form in Figure 2-2 "Pre-quote Worksheet for DICOM Network Information" on page 2-14. Ensure that there are no spaces in any field of the form.

Entries must include:

- A host name, local port number, AE Title, IP address and Net Mask for the Vivid 7.
- The IP addresses for the default gateway and other routers at the site for ROUTING INFORMATION.
- The host name, IP address, port and AE Title for each device the site wants connected to the Vivid 7 for DICOM APPLICATION INFORMATION. A field for the make (manufacturer) and the revision of the device, is also included. This information may be useful for error solving.

2-3-5-5 Pre-quote Worksheet



Vivid 7

Host Name

Local Port

IP Address . . .

AE Title

Net Mask . . .

ROUTING INFORMATION

	Destination IP Addresses	GATEWAY IP Addresses
Default		. . .
ROUTER1	. . .	. . .
ROUTER2	. . .	. . .
ROUTER3	. . .	. . .

DICOM APPLICATION INFORMATION

	NAME	MAKE/REVISION	AE TITLE	IP ADDRESSES	PORT
Store 1				. . .	
Store 2				. . .	
Store 3				. . .	
Store 4				. . .	
Store 5				. . .	
Store 6				. . .	
Worklist				. . .	
Storage Commit				. . .	
MPPS				. . .	

Figure 2-2 Pre-quote Worksheet for DICOM Network Information

Chapter 3
System Setup

Section 3-1
Overview

3-1-1 Purpose of Chapter 3

This chapter contains information needed to install Vivid 7. Included is a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim.

How to prepare the facility and unit of the actual installation, and how to check and test the unit, probes, and external peripherals for electrical safety are included in this procedure. Also included in this section are guidelines for transporting the unit to a new site.

3-1-2 Contents in Chapter 3

Table 3-1 Contents in Chapter 3

SECTION	DESCRIPTION	PAGE NUMBER
3-1	Overview	3-1
3-2	Installation Reminders	3-2
3-3	Receiving and Unpacking the Equipment	3-4
3-4	Packing Materials - Recycling Information	3-13
3-5	Preparing for Setup	3-14
3-6	Completing the Setup	3-14
3-7	. Configuration	3-28
3-8	Connectivity Overview	3-41
3-9	Connectivity Setup - Software v7.x (BT'08), v6.x, v5.x and v4.x	3-42
3-10	Connectivity Setup - Software v3.x	3-89
3-11	Connectivity Setup - Software v2.x	3-109
3-12	Ethernet Switch / Hub	3-133
3-13	Installation Paperwork	3-136

Section 3-2
Installation Reminders

3-2-1 Average Installation Time

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	0.5 hour	
Install Scanner wo/options	4 hours	Dependent on the configuration
DICOM Network Configuration	2 hours	Dependent on the configuration

3-2-2 Installation Warnings

DANGER **WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DON'T TOUCH THE UNIT!**

CAUTION **If the unit is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.**

Table 3-3 Vivid 7 Acclimate Time

	DON'T STORE AT THESE TEMPERATURES				KEEP STORAGE TEMPERATURE WITHIN THESE LIMITS																
ºC	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60
ºF	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122	131	140
Hrs	20	18	16	14	12	10	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8

CAUTION **TO PREVENT ELECTRICAL SHOCK, CONNECT THE UNIT TO A PROPERLY GROUNDED POWER OUTLET. DO NOT USE A THREE TO TWO PRONG ADAPTER. THIS DEFEATS SAFETY GROUNDING.**

CAUTION **DO NOT WEAR THE ESD WRIST STRAP WHEN YOU WORK ON LIVE CIRCUITS AND MORE THAN 30 V PEAK IS PRESENT.**

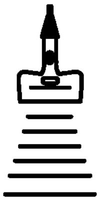
3-2-2 Installation Warnings (cont'd)

CAUTION **DO NOT OPERATE THIS UNIT UNLESS ALL BOARD COVERS AND FRAME PANELS ARE SECURELY IN PLACE. SYSTEM PERFORMANCE AND COOLING REQUIRE THIS.**

CAUTION **OPERATOR MANUAL(S)**

THE USER MANUAL(S) SHOULD BE FULLY READ AND UNDERSTOOD BEFORE OPERATING THE Vivid 7 AND KEPT NEAR THE UNIT FOR QUICK REFERENCE.

CAUTION **ACOUSTIC OUTPUT HAZARD**



ALTHOUGH THE ULTRASOUND ENERGY TRANSMITTED FROM THE Vivid 7 PROBE IS WITHIN AIUM/NEMA STANDARDS, AVOID UNNECESSARY EXPOSURE. ULTRASOUND ENERGY CAN PRODUCE HEAT AND MECHANICAL DAMAGE.

Section 3-3
Receiving and Unpacking the Equipment

3-3-1 Overview

3-3-1-1 Purpose of this section

This section describes how to receive and unpack Vivid 7.

Table 3-4 Contents in this section

Section	Description	Page Number
3-3-1	Overview	3-4
3-3-2	The Post Delivery Checklist	3-5
3-3-3	The Tilt & Shock Indicators	3-6
3-3-4	Receiving the Vivid 7	3-7
3-3-5	Unpacking Vivid 7	3-10

CAUTION **TWO PEOPLE ARE NEEDED TO UNPACK THE UNIT BECAUSE OF ITS WEIGHT. ATTEMPTS TO MOVE THE UNIT CONSIDERABLE DISTANCES OR ON AN INCLINE BY ONE PERSON COULD RESULT IN INJURY OR DAMAGE OR BOTH.**

TWO PEOPLE ARE REQUIRED WHENEVER A PART WEIGHING 16 KG (35 LBS) OR MORE MUST BE LIFTED.

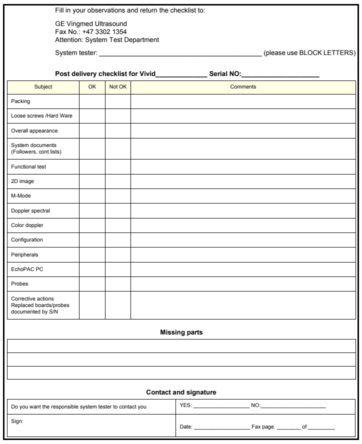
CAUTION **REMEMBER TO USE RELEVANT PERSONAL PROTECTING EQUIPMENT (PPE) DURING PACKING/UNPACKING. CHECK WITH YOUR LOCAL EHS REPRESENTATIVE.**

3-3-2 The Post Delivery Checklist

3-3-2-1 Introduction

Before shipment from the factory, the Vivid 7 has been thoroughly tested and visually inspected. Vivid 7 ultrasound scanners are fine tuned electronic instruments and should be treated properly during transportation.

To learn about any issues that are discovered at the reception of the package or when unpacking and installing the Vivid 7, the Post Delivery Checklist has been introduced.



Fill in your observations and return the checklist to:

GE Vingmed Ultrasound
Fax No.: +47 3302 1354
Attention: System Test Department

System tester: ______________________________ (please use BLOCK LETTERS)

Post delivery checklist for Vivid___________ Serial NO:_______________

Subject	OK	Not OK	Comments
Packing			
Loose screws /Hard Ware			
Overall appearance			
System documents (Followers, cont.lists)			
Functional test			
2D image			
M-Mode			
Doppler spectral			
Color doppler			
Configuration			
Peripherals			
EchoPAC PC			
Probes			
Corrective actions Replaced boards/probes documented by S/N			

Missing parts

Contact and signature

Do you want the responsible system tester to contact you	YES: _______________ NO:_________________
Sign:	Date: _______________ Fax page. _______ of ________

Figure 3-1 The Post Delivery Checklist

The receiving -, unpacking- and installation instructions in this manual are all referring to this checklist.

Please send the completed **Post Delivery Checklist** to the address or telefax number printed on the top of the checklist as soon as the installation has been completed.

3-3-2-2 Where Do I Find a Copy of the Post Delivery Checklist?

- The Post Delivery Checklist is included in each package with a Vivid 7.
- A copy of the Post Delivery Checklist is included at the end of this chapter.
- A copy of the Post Delivery Checklist is also included in the Unpacking Procedure.

3-3-3 The Tilt & Shock Indicators

3-3-3-1 Overview

Improper handling during transportation may harm the equipment inside the package even if the package itself is undamaged.

To make it easier to detection if the handling during transportation has been improper, a set of Tilt & Shock indicators have been attached to the transportation box.

3-3-3-2 Position of the Tilt & Shock Indicators

The Tilt & Shock indicators have been attached to the right side of the transportation box as illustrated in the figure below.

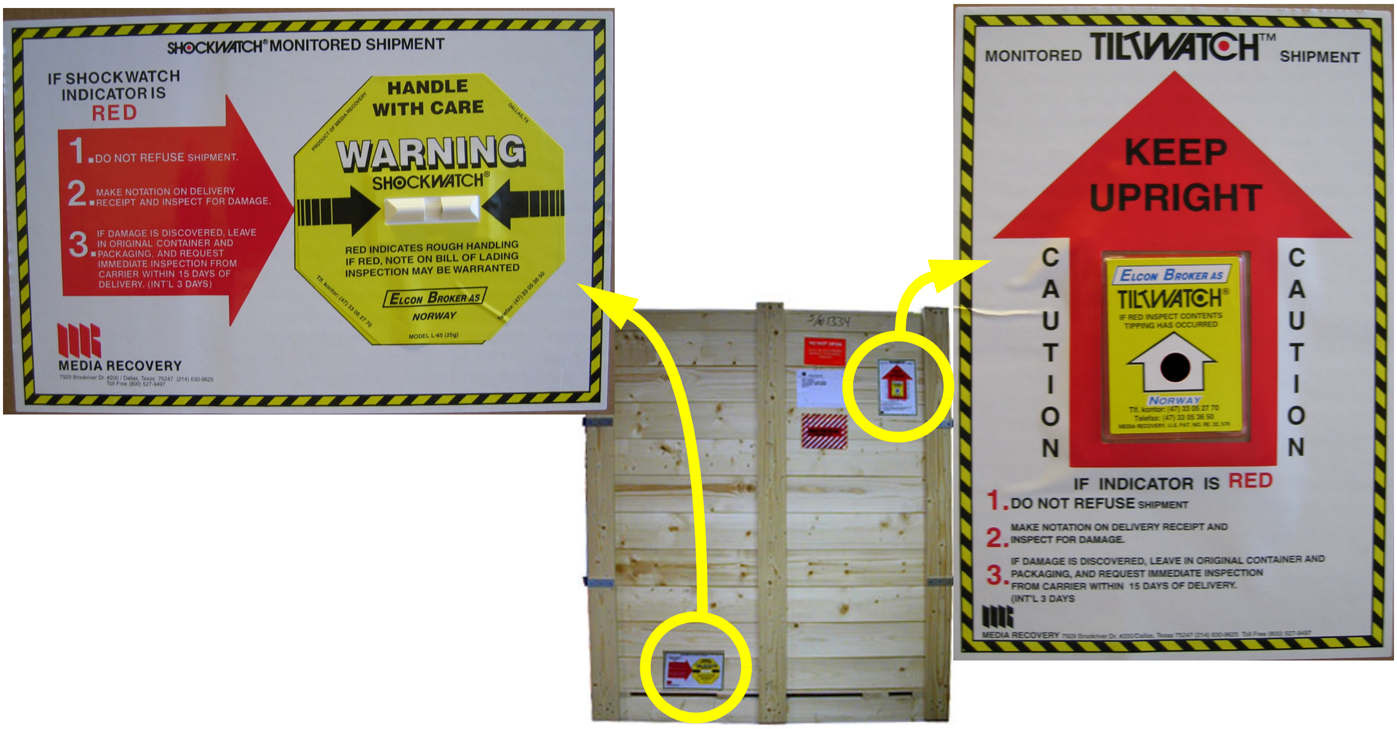

SHOCKWATCH® MONITORED SHIPMENT
IF SHOCKWATCH INDICATOR IS RED
1. DO NOT REFUSE SHIPMENT.
2. MAKE NOTATION ON DELIVERY RECEIPT AND INSPECT FOR DAMAGE.
3. IF DAMAGE IS DISCOVERED, LEAVE IN ORIGINAL CONTAINER AND PACKAGING, AND REQUEST IMMEDIATE INSPECTION FROM CARRIER WITHIN 15 DAYS OF DELIVERY. (INT'L 3 DAYS)
MEDIA RECOVERY
HANDLE WITH CARE
WARNING
SHOCKWATCH®
RED INDICATES ROUGH HANDLING IF RED, NOTE ON BILL OF LADING INSPECTION MAY BE WARRANTED
ELCON BROKER AS
NORWAY
MONITORED TILTWATCH™ SHIPMENT
KEEP UPRIGHT
CAUTION
CAUTION
ELCON BROKER AS
TILTWATCH®
IF RED INSPECT CONTENTS TIPPING HAS OCCURRED
NORWAY
IF INDICATOR IS RED
1. DO NOT REFUSE SHIPMENT
2. MAKE NOTATION ON DELIVERY RECEIPT AND INSPECT FOR DAMAGE.
3. IF DAMAGE IS DISCOVERED, LEAVE IN ORIGINAL CONTAINER AND PACKAGING, AND REQUEST IMMEDIATE INSPECTION FROM CARRIER WITHIN 15 DAYS OF DELIVERY. (INT'L 3 DAYS
MEDIA RECOVERY

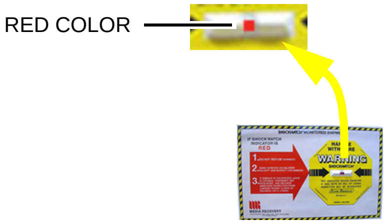
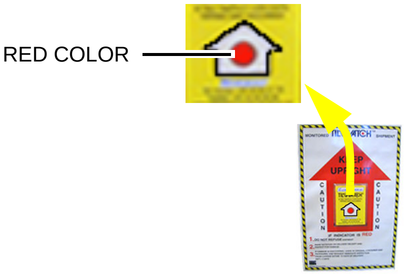
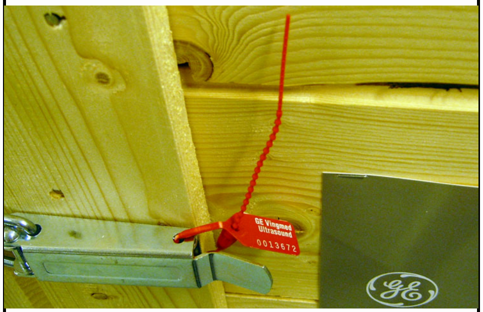
Figure 3-2 Tilt & Shock indicators's position on right side of transportation box

3-3-4 Receiving the Vivid 7

3-3-4-1 Examine All Packages

Examine all packages closely at time of delivery, as described in the procedure below.

Table 3-5 Examine All Packages

STEP	TASK	ILLUSTRATIONS
1	Is damage apparent? • If *yes*; continue with the instructions in subsection 3-3-4-2 - Damage in Transportation. • If *no*; continue with the next step.	
2	Is the Shock Indicator red colored inside the middle of the indicator? • If *yes*: The Shock Indicator has been activated. Continue with the instructions in subsection 3-3-4-2 - Damage in Transportation. • If *no*: Continue with step 2.	
3	Is the Tilt Indicator red colored inside the middle of the indicator? • If *yes*: The Tilt Indicator has been activated. Continue with the instructions in subsection 3-3-4-2 - Damage in Transportation before you continue with the next step. • If *no*: Continue with the instructions in 3-3-5 - Unpacking Vivid 7.	
4	The two upper hinges on the Front Side and the Rear Side of the wooden transportation bow have been sealed with red plastic seals, marked GE Vingmed Ultrasound and a serial number. Verify that the four red plastic seals are intact at arrival. **If seals are broken:** If broken, it indicates that the container may have been opened after it left the manufacturer. Continue with the instructions in subsection 3-3-4-2 - Damage in Transportation. Continue with the instructions in 3-3-5 - Unpacking Vivid 7.	

3-3-4-2 Damage in Transportation

Follow this procedure if damage is apparent, or if the Tilt & Drop Indicators show failure:

Table 3-6 Damage in Transportation

STEP	TASK
1	Write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent.
2	Report the damage to the carrier. • Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. • A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.
3	Report the damage on the Post Delivery Checklist. Specify if the tilt & drop indicators show failure in the “Packing” field on the Post Delivery Checklist.

3-3-4-3 Vivid 7 Transportation Box Label

The **Vivid 7** Transportation Box Label is located at the front of the transportation box.

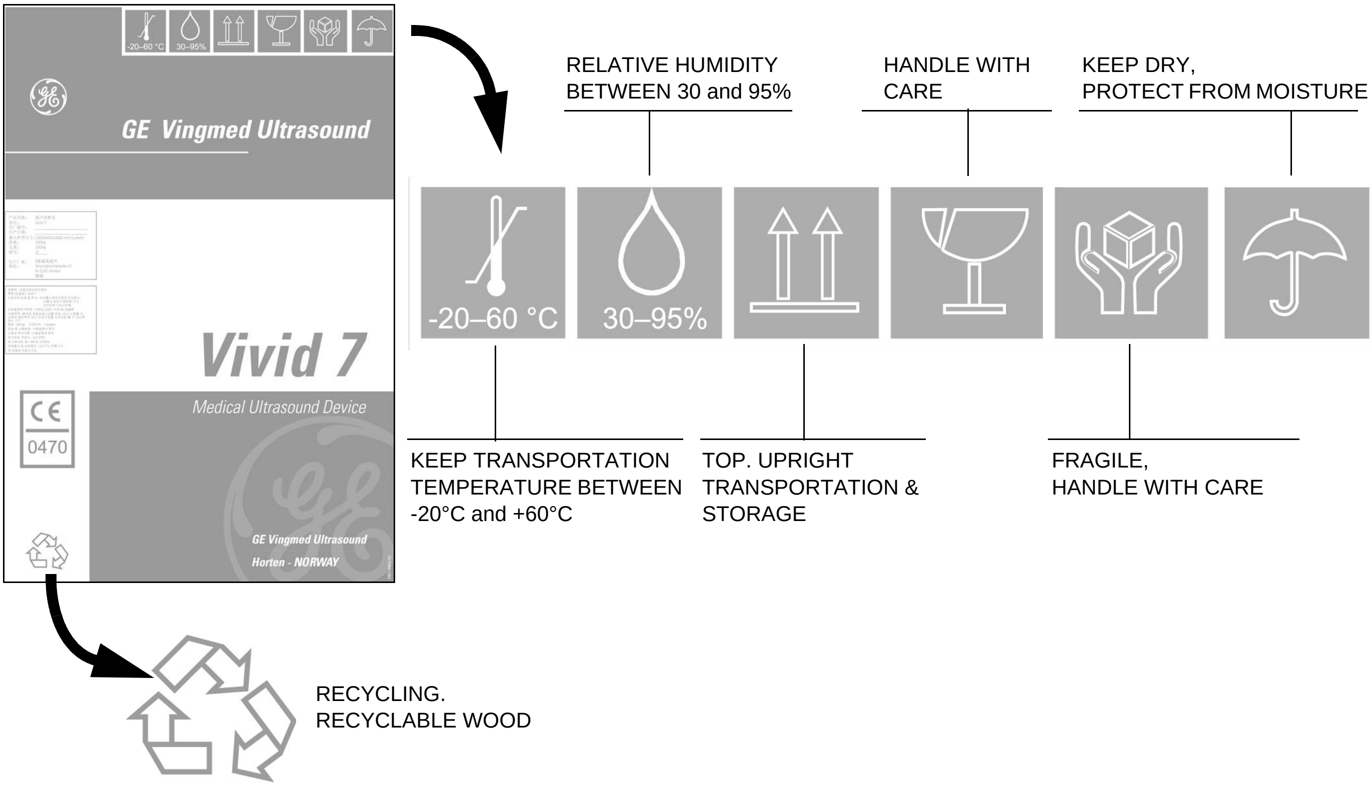

-20–60 °C
30–95%
GE Vingmed Ultrasound
Vivid 7
Medical Ultrasound Device
0470
GE Vingmed Ultrasound
Horten - NORWAY
RELATIVE HUMIDITY BETWEEN 30 and 95%
HANDLE WITH CARE
KEEP DRY, PROTECT FROM MOISTURE
-20–60 °C
30–95%
KEEP TRANSPORTATION TEMPERATURE BETWEEN -20°C and +60°C
TOP. UPRIGHT TRANSPORTATION & STORAGE
FRAGILE, HANDLE WITH CARE
RECYCLING. RECYCLABLE WOOD

Figure 3-3 Vivid 7 Transportation Box Label

3-3-5 Unpacking Vivid 7

CAUTION **Two people are needed to unpack the unit because of its weight.**
Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage or both.

Two people are required whenever a part weighing 16 kg (35 lbs) or more must be lifted or pushed up or down a slope.

Table 3-7 Unpacking Vivid 7

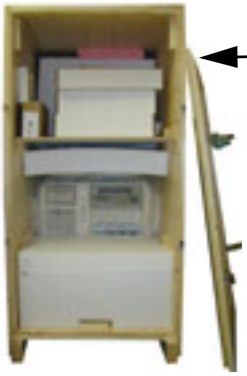
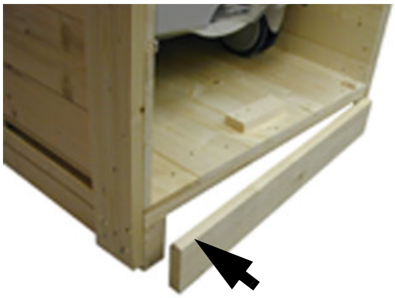
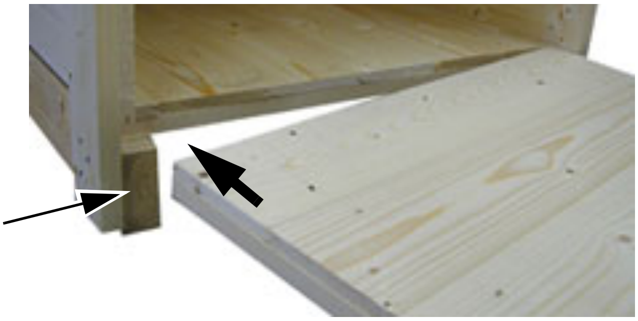
Step	Task
1.	Open the four hinges on each door and remove the doors. One of the doors are used as ramp out off and into the transportation box. On the first version of the Transportation Box, only the front door is meant to be used as a ramp. It has bevel cut in one end.  Front door bevel cut. This end of the door should be used as the lower end of the ramp.
2.	Place the front door as a ramp against the rear edge of the pallet.  On the first version transportation box, which is no longer manufactured by GE, a 10 cm board (not furnished) is placed as a support under the upper end of the ramp.  On the second version transportation box, the ramp is placed directly on the labank ends.
3.	Carefully remove the accessory box, and any other items, including the wooden shelf above the scanners keyboard. - Vivid 7 with LCD monitor: Part #10, support for the LCD monitor, can't be removed at this time. Remove the rest of the packing material from the transportation box. - Vivid 7 with CRT monitor: Remove all the filling material, from the transportation box.

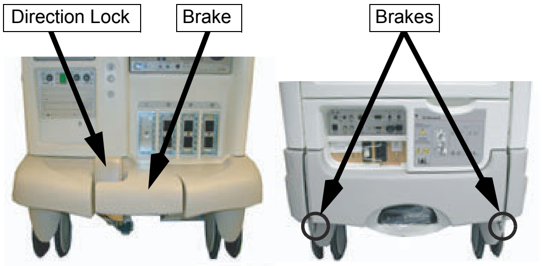
Table 3-7 Unpacking Vivid 7 (cont'd)

Step	Task
4.	

NOTICE

Moving Vivid 7/Logiq 9 in and out of the transportation box

Vivid 7/Logiq 9 has brakes on all wheels, but direction lock only on the front wheels. The wheels position when moving the system into its transportation box are therefore vital. If the wheels are swiveling when the system is inside the transportation box, it may jam the system inside the box. The system must be moved backwards both into and out of the transportation box.



Front Wheels **Rear Wheels**

Figure 1: Brakes and direction locks

Moving the system into the transportation box

1. **Align the front wheel under the front end of the system as shown in Figure 1.**
2. **Push the direction lock pedal to lock the front wheels in this direction. Check that they are locked.**
3. **Push the Top Console to its lowest and most backward locked position.**
4. **Pull the system into the box with the rear end first.**

Moving the system out of the transportation box

1. **Unlock brakes but keep direction lock activated. The direction lock keeps the front wheels in position, and secures the direction stability when the system is rolled out of the transportation box.**
2. **Pull the system out of the box with rear end first.**

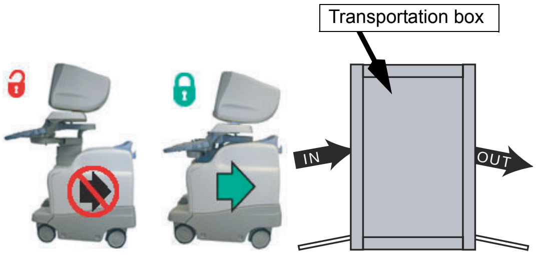


Figure 2: Console and Wheels position

⚠ CAUTION

Have two people available to unpack the system. Attempts to move the system considerable distances or on an incline by one person could result in injury or damage or both.

Transport notice FC314187-03

- Press once on the brake pedal to release the brakes.
- Keep direction lock activated. The direction lock keeps the front wheels from swiveling and blocking the system inside the narrow transportation box.

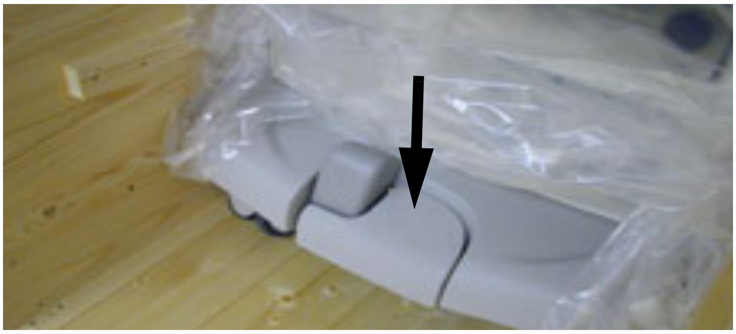
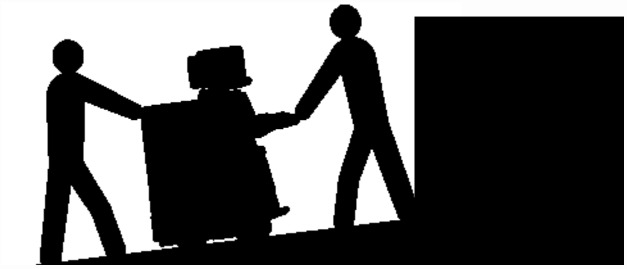


Table 3-7 Unpacking Vivid 7 (cont'd)

Step	Task
5.	Carefully move the instrument out of the Transportation Box, down the ramp, with rear end first. 
6.	Vivid 7 with LCD: Remove part number 10 (LCD monitor enforcement).
7.	Remove the clear plastic (wrapped around the scanner) from the unit.
8.	Place all the filling material inside the Transportation Box, close it and store it for possible use in the future.

Section 3-4
Packing Materials - Recycling Information

The packing materials for Vivid 7 are recyclable:

- The Transportation Box is made of spruce or similar material.
  (“PHYTOSANITARY CERTIFICATE” included in all shipments to The People's Republic of China.)
- Lever lockings (hinges) are made of zinc plated steel.
- The inner reinforcements are made of Ethafoam (Polyethylene foam).
- The plastic foil is made of LDPE (Low Density Polyethylene).

Section 3-5
Preparing for Setup

3-5-1 Physical Inspection

- Verify that the system arrived intact (visual inspection).
  If the system has been damaged, please refer to “Damage in Transportation“ on page viii in the beginning of this manual.
- Verify that all items are present (see the Packing List). Report any missing parts on the **Post Delivery Checklist**.

3-5-2 EMI Protection

This unit has been designed to minimize the effects of Electro-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

See *2-2-3 "EMI Limitations" on page 2-7* for more information about EMI protection.

Section 3-6
Completing the Setup

3-6-1 System Specifications

3-6-1-1 System Requirements Verification

- Verify that the site meets the requirements listed in Chapter 2.
- Verify that the specifications below don’t conflict with any on-site conditions.

3-6-1-2 Physical Dimensions

The physical dimensions of the Vivid 7 unit are summarized in Table 3-8.

Table 3-8 Physical Dimensions of Vivid 7 with monitor and peripherals

Height	Width	Depth	Unit
137.5 - 157.5	64	90	cm
54.1 - 62	25.2	35,4	Inches

3-6-1-3 Mass (Weight) with Monitor and Peripherals

Table 3-9 Weight of Vivid 7 with monitor and peripherals

Model	Weight [kg]	Weight [lbs]
Vivid 7	200	410

3-6-1-4 Maximum Audio Noise

Less than 70dB(A) according to the standard DIN 45635 - 19 - 01 - KL2.

3-6-2 Electrical Specifications

WARNING ***CONNECTING A Vivid 7 UNIT TO THE WRONG VOLTAGE LEVEL WILL MOST LIKELY DESTROY THE UNIT.***

3-6-2-1 Verification of the System's Voltage Settings

Verify that the mains voltage specified for the unit is available on-site.

The Voltage setting for the unit is found on a label near the Mains Power Circuit Breaker at the rear of the system, see Figure 3-4 on page 3-15.

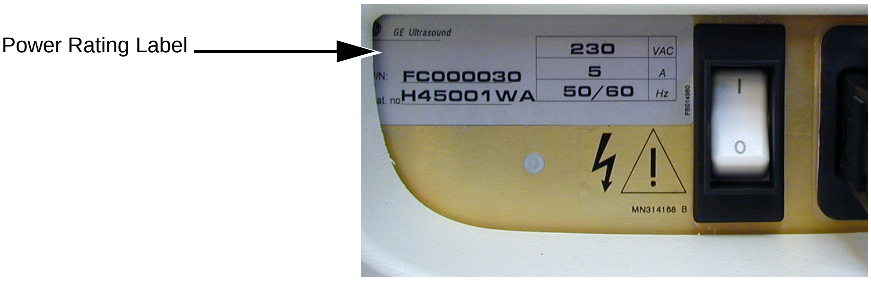

Power Rating Label
GE Ultrasound
230 VAC
5 A
50/60 Hz
FC000030
H45001WA
I
O
MN314168 B

Figure 3-4 Mains Circuit Breaker and Power Rating Label

See also Table 3-10 "Electrical Specifications for Vivid 7" on page 3-16.

3-6-2-2 Electrical Specifications for Vivid 7

Table 3-10 Electrical Specifications for Vivid 7 sheet 1 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FD000010	VIVID 7 DIMENSION CONSOLE, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000020	VIVID 7 DIMENSION CONSOLE, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000120	VIVID 7 PRO CONSOLE, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000130	VIVID 7 PRO CONSOLE, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000140	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000150	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000160	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000170	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FD000180	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR	230 VAC	±10%	5 A	50-60 Hz
FD000190	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR	100-120 VAC	±10%	10 A	50-60 Hz
FC000890	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT’06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000900	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT’06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000910	VIVID 7 DIMENSION (BT’06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000920	VIVID 7 DIMENSION (BT’06) 100-120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000930	VIVID 7 PRO (BT’06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000940	VIVID 7 PRO (BT’06) 100-120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000950	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT’06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000960	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT’06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz

Table 3-10 Electrical Specifications for Vivid 7 (cont'd) sheet 2 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FC000970	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 230 VAC	230 VAC	±10%	5 A	50-60 Hz
FC000980	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 120 VAC	110-120 VAC	±10%	10 A	50-60 Hz
FC000760	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME	230 VAC	±10%	5 A	50-60 Hz
FC000770	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME	110-120 VAC	±10%	10 A	50-60 Hz
FC000780	VIVID 7 DIMENSION	230 VAC	±10%	5 A	50-60 Hz
FC000790	VIVID 7 DIMENSION	100-120 VAC	±10%	10 A	50-60 Hz
FC000800	VIVID 7 PRO (BT'05),	230 VAC	±10%	5 A	50-60 Hz
FC000810	VIVID 7 PRO (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000820	VIVID 7 DIMENSION MULTI-DIMENSIONAL IMAGING (BT'05)	230 VAC	±10%	5 A	50-60 Hz
FC000830	VIVID 7 DIMENSION MULTI-DIMENSIONAL IMAGING (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000840	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05)	230 VAC	±10%	5 A	50-60 Hz
FC000850	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05)	100-120 VAC	±10%	10 A	50-60 Hz
FC000699	Vivid 7 (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000660	Vivid 7 PRO (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000650	Vivid 7 PRO (BT '04)	230 VAC	±10%	5 A	50-60 Hz
FC000640	Vivid 7 Dimension (BT '04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000630	Vivid 7 Dimension (BT '04)	230 VAC	±10%	5 A	50-60 Hz
FC000620	Vivid 7 Dimension with 4D (BT'04)	100-120 VAC	±10%	10 A	50-60 Hz
FC000610	Vivid 7 Dimension with 4D (BT'04)	230 VAC	±10%	5 A	50-60 Hz
FC000440	Vivid 7 PRO with RFI	100-120 VAC	±10%	10 A	50-60 Hz
FC000430	Vivid 7 PRO with RFI	230 VAC	±10%	5 A	50-60 Hz
FC000420	Vivid 7 with RFI	100-120 VAC	±10%	10 A	50-60 Hz
FC000410	Vivid 7 with RFI	230 VAC	±10%	5 A	50-60 Hz
FC000340	Vivid 7 PRO (BT '03)	100-120 VAC	±10%	10 A	50-60 Hz
FC000330	Vivid 7 PRO (BT '03)	230 VAC	±10%	5 A	50-60 Hz
FC000320	Vivid 7 (BT '03)	100-120 VAC	±10%	10 A	50-60 Hz
FC000310	Vivid 7 (BT '03)	230 VAC	±10%	5 A	50-60 Hz
FC000210	Vivid 7 (BT '02)	100-120 VAC	±10%	10 A	50-60 Hz
FC000200	Vivid 7 (BT '02)	230 VAC	±10%	5 A	50-60 Hz

Table 3-10 Electrical Specifications for Vivid 7 (cont'd) sheet 3 of 3

GE VINGMED PART NUMBER	DESCRIPTION	VOLTAGE	TOLERANCES	CURRENT	FREQUENCY
FC000190	Vivid 7 PRO (BT '02)	100-120 VAC	±10%	10 A	50-60 Hz
FC000180	Vivid 7 PRO (BT '02)	230 VAC	±10%	5 A	50-60 Hz
FC000060	Vivid 7 (BT '01)	100-120 VAC	±10%	10 A	50-60 Hz
FC000030	Vivid 7 (BT '01)	230 VAC	±10%	5 A	50-60 Hz

3-6-3 Connections on the External IO

3-6-3-1 Connect Footswitch

Connect the Footswitch to the External I/O at the rear side of Vivid 7. When not in use, store it in the tray below.

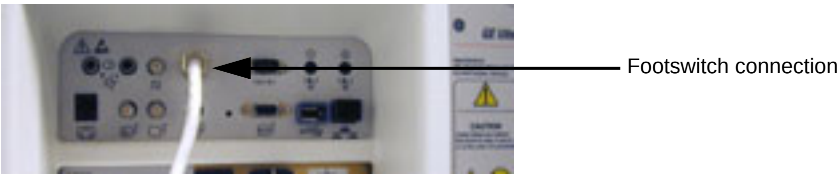


Figure 3-5 Footswitch connection

3-6-3-2 Connect Ethernet

Connect Ethernet to the External I/O at the rear side of Vivid 7.

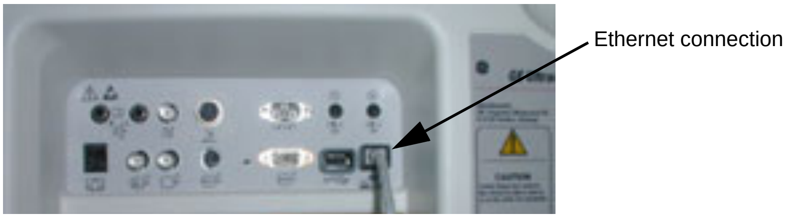


Figure 3-6 Ethernet connection

3-6-3-3 Connect USB Flash Card

NOTE: Support for USB Flash Card was introduced in software version v4.0.

NOTE: USB Flash Cards approved for Vivid 7 are verified for EMC performance according to EN55011 class B. The use of any other USB Flash Cards will compromise this verification, and may cause interference on Vivid 7 itself, or on other electronic devices. For approved models, see: Table 9-54 "USB Flash Card (USB Drive)" on page 9-67.

Install the USB Flash Card in (one of) the USB port(s) on the front of Vivid 7.

- Vivid 7 with BEP4.x has one USB 2.0 port on the front.
- Vivid 7 with BEP3.x has two USB 2.0 ports on the front.

The port at the rear of the system, is USB 1.1, and is not approved for use by the USB Flash Card.

3-6-4 Connections on the Patient I/O Panel

3-6-4-1 Connect ECG

Connect ECG to Patient I/O Module in the front of Vivid 7.

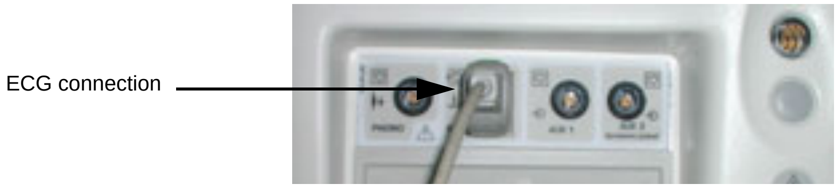

ECG connection

Figure 3-7 ECG connection to Patient I/O Module

3-6-4-2 Connect Phono

Connect Phono to Patient I/O Module in the front of Vivid 7.

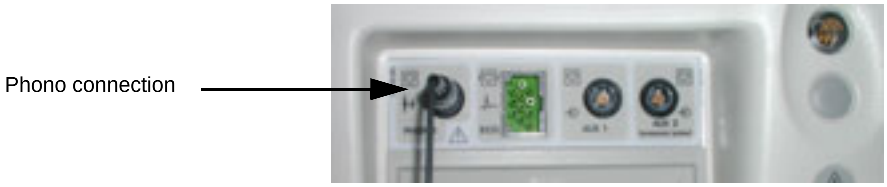

Phono connection

Figure 3-8 Phono connection

3-6-4-3 Connect Pulse Pressure Transducer

Connect Pulse Pressure Transducer to Patient I/O Module in the front of Vivid 7.

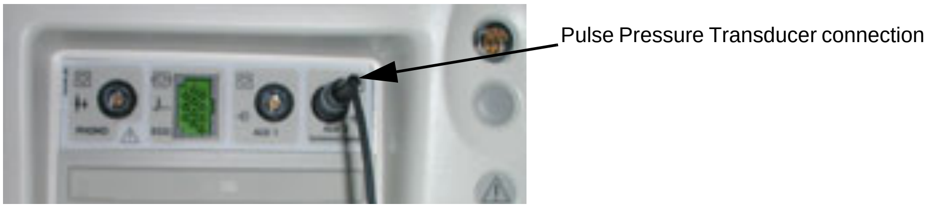

Pulse Pressure Transducer connection

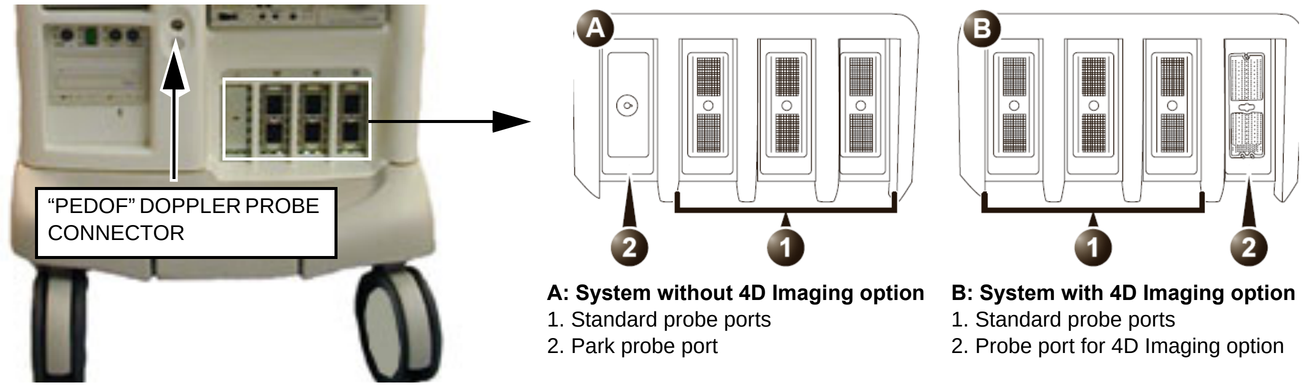
Figure 3-9 Pulse Pressure Transducer connection

3-6-5 Probe Connection

V7/V7 PRO has four positions to plug in probes.

- On systems without the 4D Imaging option, the left connector is a “dummy” connector, only used for parking one probe connector. The three other connectors can be selected and used for scanning.
- On systems with the 4D Imaging option, the three leftmost connectors are standard probe ports and the probe port to the right is for the 4D Imaging option.

A separate “Pedof” Doppler probe connector is also available.



A: System without 4D Imaging option
1. Standard probe ports
2. Park probe port

B: System with 4D Imaging option
1. Standard probe ports
2. Probe port for 4D Imaging option

Figure 3-10 Probe Connectors

3-6-5-1 Connect a Probe

NOTE: It is not necessary to turn OFF Power to connect or disconnect a probe.

CAUTION DO NOT ALLOW THE PROBE HEAD TO HANG FREELY. EXCESSIVE IMPACT TO THE PROBE WILL RESULT IN IRREPARABLE DAMAGE.

CAUTION TO PREVENT PROBE CONNECTOR PINS, OR PCB BOARD DAMAGE, DO NOT USE EXCESSIVE FORCE WHEN CONNECTING THE PROBES.

CAUTION DO NOT USE EXCESSIVE FORCE ON THE CONNECTORS. PINS CAN BE BENT, OR PCB BOARD HOLDING PROBE CONNECTORS CAN BE DAMAGED.

1.) Hold the probe connector vertically with the cable pointing upward.
2.) Turn the connector locking handle counter-clockwise to the horizontal position.
3.) Align the connector with the probe port and carefully push into place.
4.) Rotate the locking handle to the full vertical position to lock in place. (See Figure 3-11.)

3-6-5-1 Connect a Probe (cont'd)

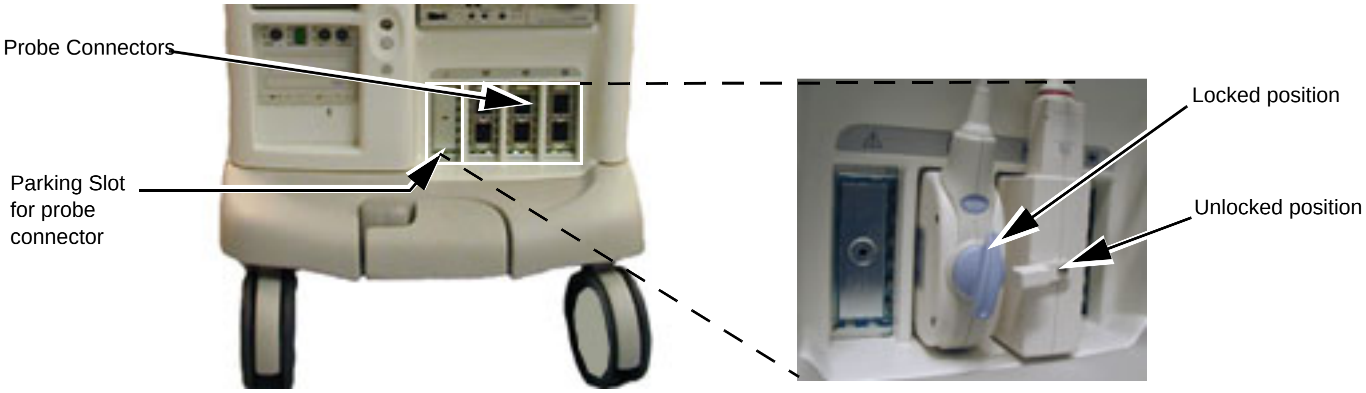

Probe Connectors
Parking Slot for probe connector
Locked position
Unlocked position

Figure 3-11 Connect Probe

5.) Position the Probe Cables in a way which the are not sweeping the floor.

⚠ **CAUTION** **Take the following precautions with the probe cables:**
- Keep the probe cables away from the wheels.
- Do not bend the probe cables.
- Do not cross cables between probes.

3-6-5-2 Disconnect Probe

1.) Rotate the lock handle counter-clockwise to the horizontal position to unlock the connector. (See Figure 3-11.)

2.) Remove the connector from the port.

3.) Ensure that the probe head is clean before placing the probe in its storage case, see section 10-5-4 on page 10-9 for cleaning instructions.

3-6-6 Power ON/Bootup

3-6-6-1 Connect Mains Power to the Unit

DANGER **ALWAYS CONNECT THE UNIT TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.**

DANGER **NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.**

DANGER **ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).**

CAUTION **SYSTEM REQUIRES ALL COVERS**

OPERATE THIS UNIT ONLY WHEN ALL BOARD COVERS AND FRAME PANELS ARE SECURELY IN PLACE. THE COVERS ARE REQUIRED FOR SAFE OPERATION, GOOD SYSTEM PERFORMANCE AND COOLING PURPOSES.

NOTICE **Use only power supply cords, cables and plugs provided by or designated by GE Healthcare.**

NOTE: Do not cycle the Circuit Breaker ON-OFF-ON in less than five (5) seconds. When turning OFF the Circuit Breaker, the system should de-energize completely before turning the circuit breaker ON.

NOTE: When turning on a system from standby mode, it takes a few seconds before it responds. Do not push the On/off button again during this period. A second push will initiate a full shutdown.

NOTE: If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on.

Follow These Steps to Connect Mains Power to the Unit

Connecting the Vivid 7 ultrasound unit involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1.) Ensure that the wall outlet is of appropriate type, and that the power switch is turned off.
2.) Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3.) Verify that the power cable is without any visible scratches or any sign of damage.
4.) Verify that the on-site mains voltage is within the limits indicated on the rating label near the Circuit Breaker at the rear of the unit.

3-6-6-1 Connect Mains Power to the Unit (cont'd)

5.) Connect the Power Cable's female plug to the Power Inlet at the rear of the unit.

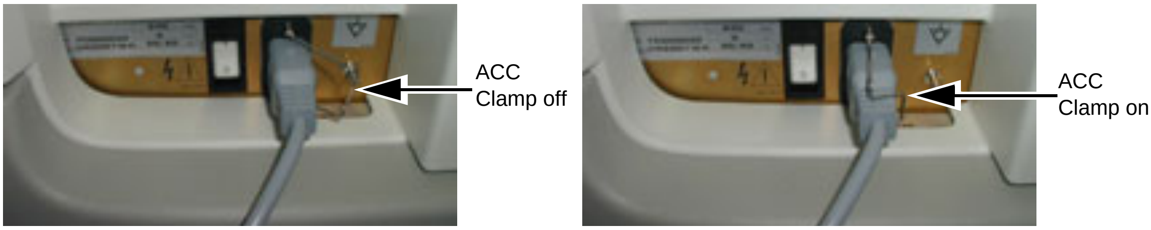

ACC
Clamp off
ACC
Clamp on

Figure 3-12 Female power plug with retaining clamp off (to the left) and on (to the right)

6.) Lock the plug in position with the Retaining Clamp (ACC Clamp).

7.) Verify that the Mains Power Circuit Breaker is in OFF position, if not, switch it OFF.

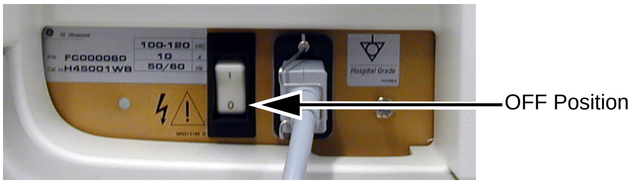

100-120
FC000060
10
H45001WB
50/60
Hospital Grade
OFF Position

Figure 3-13 Mains Power Circuit Breaker is in OFF position

8.) Connect the Power Cable's other end (male plug) to a hospital grade mains power outlet with the proper rated voltage, and the unit is ready for Power ON/Bootup.

3-6-6-2 Turn Unit ON

1.) Switch ON the Mains Power Circuit Breaker at the rear of the unit.

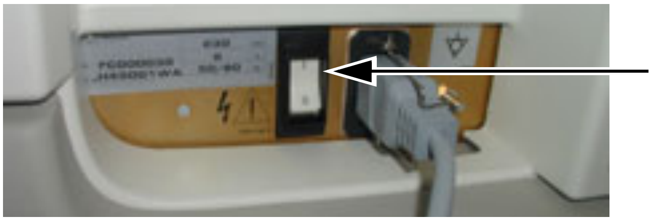

Mains Power Circuit Breaker in ON position

Figure 3-14 Switch Mains Power Circuit Breaker ON

You should hear a “click” from the relays in the AC Power/AC Controller and the unit is ready to boot.

NOTE: *If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on.*

2.) Press once on the **ON/OFF KEY** on the Operator Panel to boot the unit.

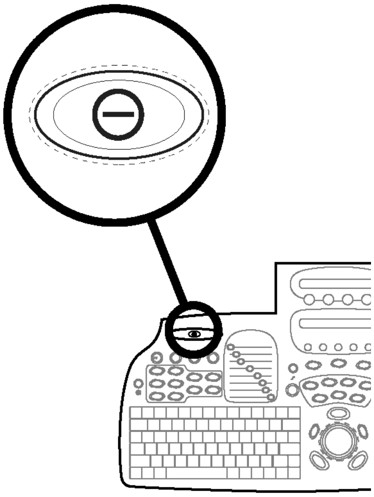


Figure 3-15 Press the On/Off key on the Operator Panel once to boot the unit

During a normal boot, you may observe that:

a.) The unit’s ventilation fan starts at full speed, but slows down after a few seconds (listen to the fan noise).

b.) Power is distributed to the peripherals, Operator Panel (Console), Monitor, Front-End Processor and Back-End Processor.

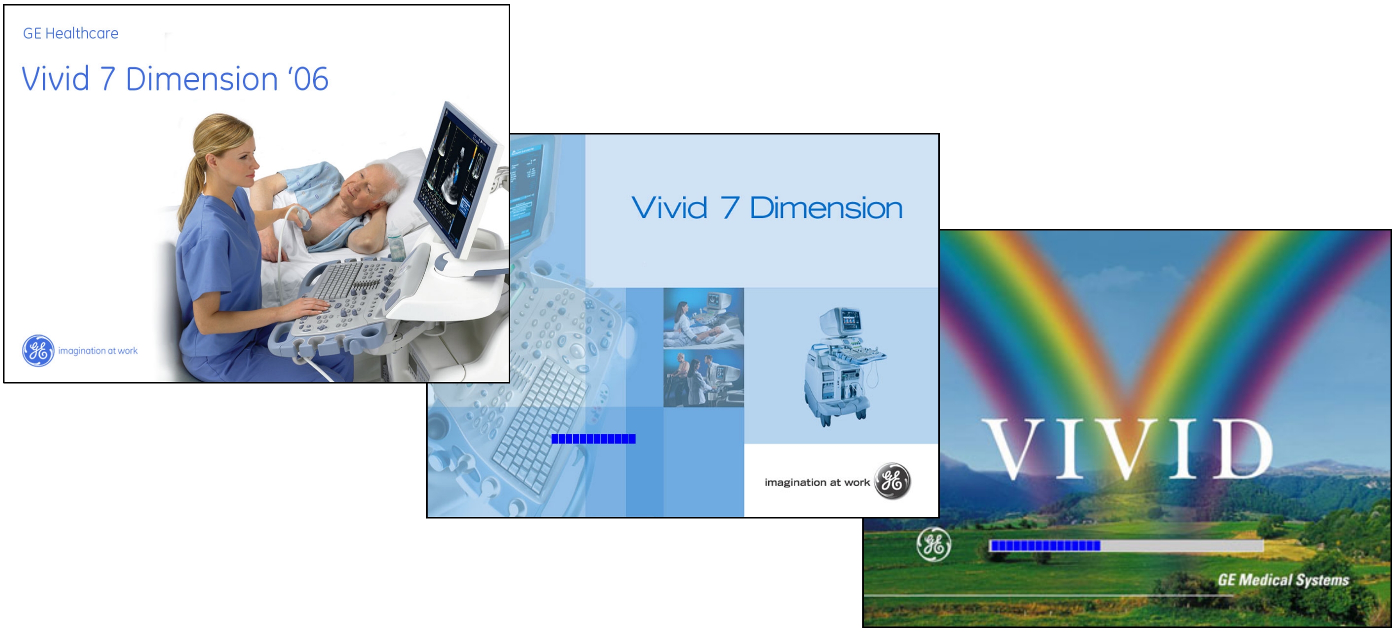
c.) Back-End Processor and rest of Scanner starts with the sequence listed in the next steps:

d.) Back-End Processor is turned ON and starts to load the software.

e.) The Start Screen (Vivid) is displayed on the monitor

3-6-6-2 Turn Unit ON (cont'd)

f.) A start-up bar indicating the time used for software loading, is displayed on the monitor.


GE Healthcare
Vivid 7 Dimension '06
imagination at work
Vivid 7 Dimension
imagination at work
VIVID
GE Medical Systems

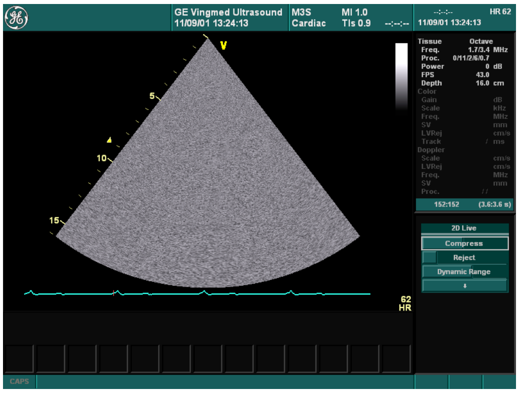
The Start-Up Screen (Splash Screen) Is different, depending on software version and Vivid 7 model. Vivid 7 Dimension with software version v6.1 or higher (upper, left), Vivid 7 Dimension with software version v4.0 to v6.1.x, (middle) and Vivid 7 with software versions v3.x.x and lower (lower, right).

Figure 3-16 Start-up bar

g.) The software initiates and sets up the Front-End electronics and the rest of the instrument.

h.) The backlight in the keyboard is lit.

i.) As soon as the software has been loaded, a 2D screen is displayed on the screen.



GE Vingmed Ultrasound
11/09/01 13:24:13
M3S Cardiac
MI 1.0 TIs 0.9
HR 62
11/09/01 13:24:13

Tissue Octave
Freq. 1.7/3.4 MHz
Proc. 0/11/2/6/0.7
Power 0 dB
FPS 43.0
Depth 16.0 cm

152:152 (3.6:3.6 s)

V
5
10
15
62
HR
Color
Gain dB
Scale kHz
Freq. MHz
SV mm
LVRej cm/s
Track / ms
Doppler
Scale cm/s
LVRej cm/s
Freq. MHz
SV mm
Proc. / /
2D Live
Compress
Reject
Dynamic Range
CAPS

Figure 3-17 2D Screen on the display.

NOTE: *Total time used for start-up is typical three minutes or less, depending on software version and Vivid 7 model.*

3-6-7 Switching OFF the Unit

See 4-2-3 "Power Shut Down" on page 4-7 for a detailed description.

1.) Press the **ON/STANDBY** button on the top left of the Control Panel to display the Exit dialog window.
2.) Select **SHUTDOWN**.
The shutdown process takes a few seconds and is completed when the Operator Panel illumination is turned off.

To completely switch off the unit before disconnecting the Mains Power Cable, follow the additional steps below:

3.) Switch the Circuit Breaker (on rear of unit) to **OFF**.
4.) Remove the plug from the mains power outlet.

Section 3-7.
Configuration

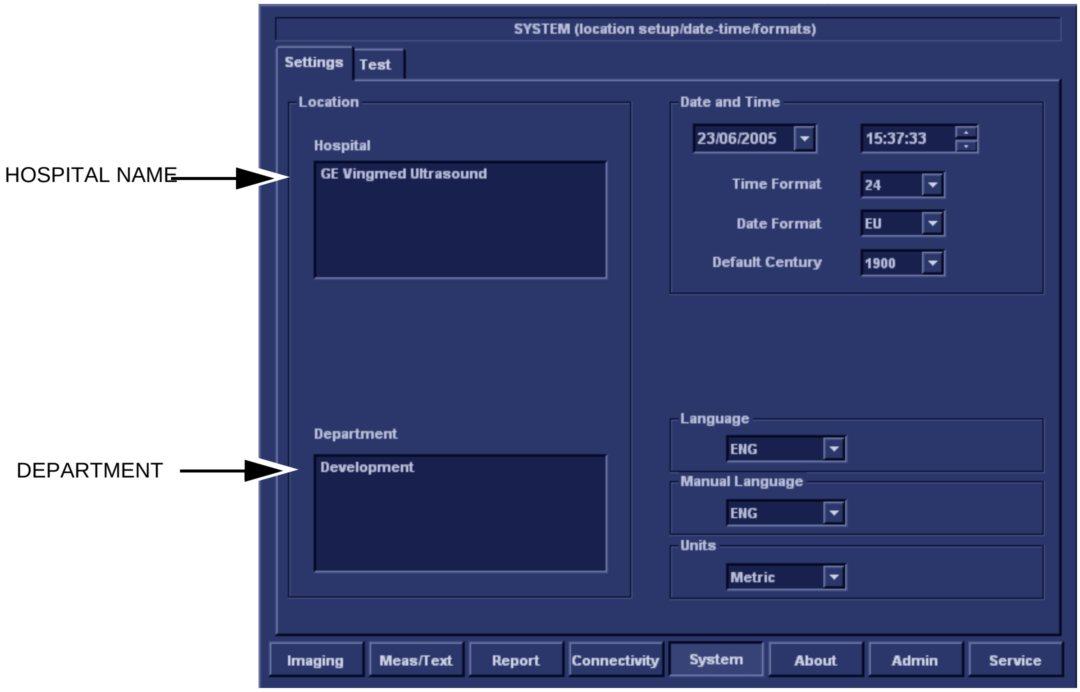
3-7-1 Vivid 7 Configuration

3-7-1-1 Select System Settings Screen

1.) Press **CONFIG** (**F2**) and log on as *ADM*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

NOTE: For software version v5.x and earlier the default password for ADM (or: adm) was left blank. Starting with software version v6.x, the password is: ***ulsadm***

2.) Select **System** and then select **Settings,** if needed.



SYSTEM (location setup/date-time/formats)

Location
Hospital: GE Vingmed Ultrasound
Department: Development

Date and Time: 23/06/2005 15:37:33
Time Format: 24
Date Format: EU
Default Century: 1900

Language: ENG
Manual Language: ENG
Units: Metric

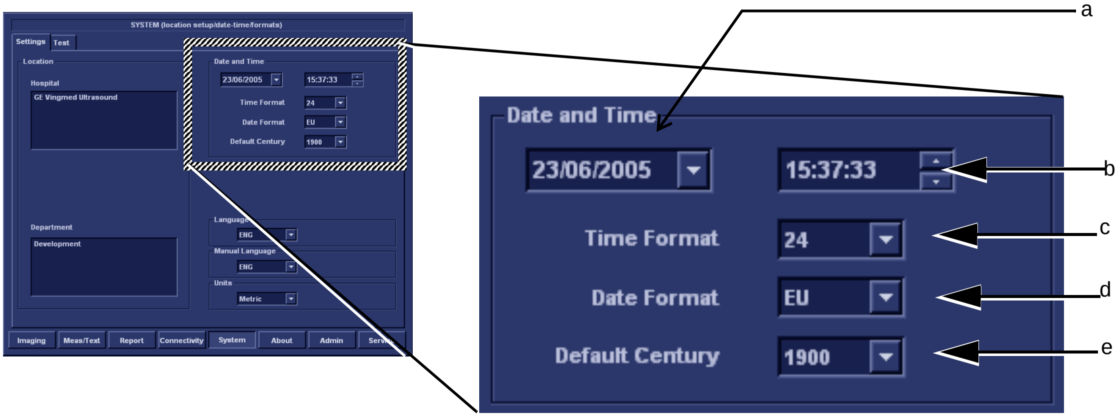
Figure 3-18 Hospital and Department Name

3-7-1-2 Enter Location

Table 3-11 Location Name

STEP	TASK	EXPECTED RESULT(S)
1	Select the Hospital field, see Figure 3-18, and type the name of the hospital (max 64 characters).	The 24 first characters of this name are displayed on the scanning screen's title bar (after restart) All 64 are displayed on the image properties on saved images (after restart).
2	Select in the Department field, see Figure 3-18, and type the name of the department (max 64 characters).	This name will be displayed on the image properties on saved images as soon as the unit has been restarted.

3-7-1-3 Date and Time Adjustments


SYSTEM (location setup/date-time/formats)
Settings
Test
Location
Hospital
Department
Language
Manual Language
Units
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Servi
a
b
c
d
e

Hospital: GE Vingmed Ultrasound
Department: Development
Language: ENG
Manual Language: ENG
Units: Metric

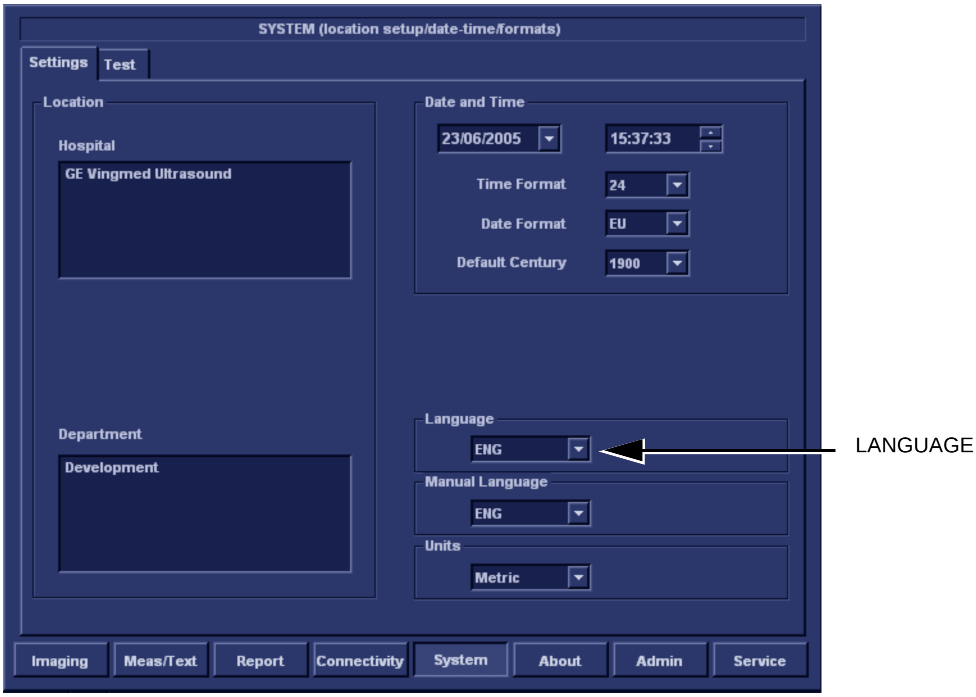
Date and Time: 23/06/2005 15:37:33
Time Format: 24
Date Format: EU
Default Century: 1900

Figure 3-19 Date and Time Adjustments

Table 3-12 Date and Time adjustments

STEP	TASK	EXPECTED RESULT(S)
1	Open the **System** (Configuration) Window, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12. Select **System**, if needed.	The **System Settings** window is displayed.
2	Adjust the **date**, see (a) in Figure 3-19.	**New date** is displayed
3	Adjust the **time**, see (b) in Figure 3-19.	**New time** is displayed
4	Select the preferred **Time Format**, see (c) in Figure 3-19.	**24:** the 24 hour format is used **12:** the 12 AM/PM hour format is used
5	Select the preferred **Date Format**, see (d) in Figure 3-19. DD = Date (two digits) MM = Month (two digits) YYYY = Year (four digits)	**EU:** the European/International "DD.MM.YYYY" format is used **US:** the American "MM.DD.YYYY" format is used
6	Select **Default Century** (1900, 2000 or None), see (e) in Figure 3-19.	**1900:** the number **19** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **2000:** the number **20** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **None:** the four digits have to be typed when entering the year in the patient date of birth. The selected setting will be used as soon as the unit has been restarted.

3-7-1-4 Language Selection


SYSTEM (location setup/date-time/formats)
Settings
Test
Location
Date and Time
Language
Manual Language
Units
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Hospital: GE Vingmed Ultrasound
Department: Development
23/06/2005 15:37:33
Time Format: 24
Date Format: EU
Default Century: 1900
Language: ENG
Manual Language: ENG
Units: Metric

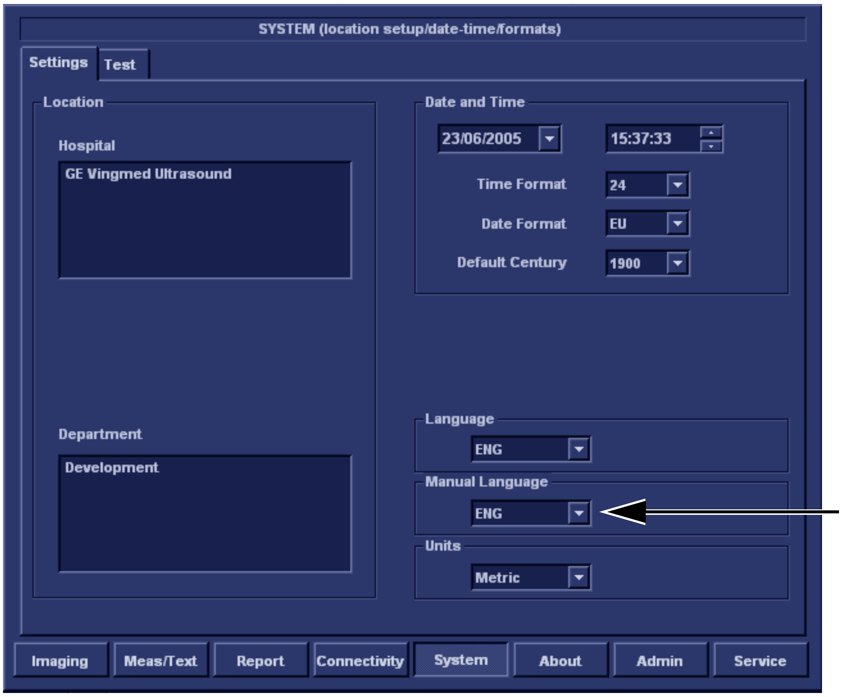
LANGUAGE

Figure 3-20 Language Selection

Table 3-13 Language Adjustments

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12. Select **System**, if needed.	The **System Settings** window is displayed.
2.	Use the **Language** drop down dialog, see Figure 3-20, to select your preferred language for the on-screen interface. The following languages are available; - ENG - English - NOR - Norwegian - DEU - German - ITA - Italian - FRA - French - ESP - Spanish - RUS - Russian - GRE - Greek - DAN - Danish - SWE - Swedish	The selected language will be used as soon as the unit has been restarted.

3-7-1-5 Online Manual Language Selection



SYSTEM (location setup/date-time/formats)

Location

Hospital: GE Vingmed Ultrasound

Department: Development

Date and Time: 23/06/2005 15:37:33

Time Format: 24

Date Format: EU

Default Century: 1900

Language: ENG

Manual Language: ENG

Units: Metric

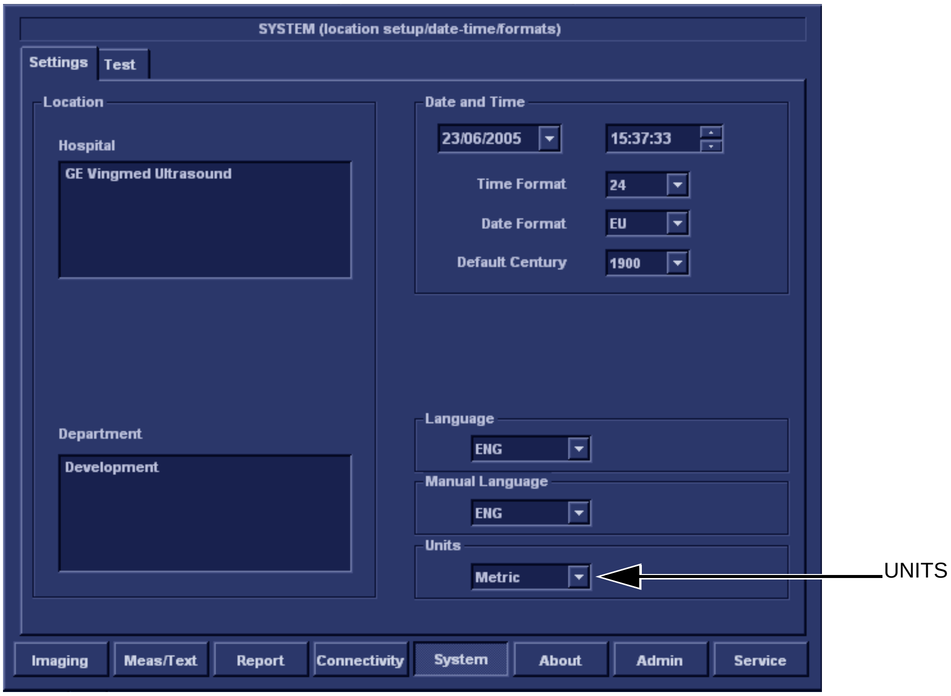
MANUAL LANGUAGE

Figure 3-21 Online Manual Language Selection

Table 3-14 Online Manual Language Selection

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12. Select **SYSTEM**, if needed.	The **System Settings** window is displayed.
2.	Use the **Manual Language** drop down dialog, see Figure 3-21, to select your preferred language for the online manual.	The selected language will be used as soon as the unit has been restarted.

3-7-1-6 Units of Measure



SYSTEM (location setup/date-time/formats)

Location

Hospital: GE Vingmed Ultrasound

Department: Development

Date and Time: 23/06/2005 15:37:33

Time Format: 24

Date Format: EU

Default Century: 1900

Language: ENG

Manual Language: ENG

Units: Metric

Figure 3-22 Select Units of Measure

Table 3-15 Select Units of Measure

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12. Select **SYSTEM**, if needed.	The **System Settings** window is displayed.
2.	Use the drop down dialog to select Metric or US Units.	The selected units (Metric or US) will be used for measurements as soon as the unit has been restarted.
3.	Restart the scanner.	All the changed settings will be used after the restart.

3-7-2 Service Screen Setup

3-7-2-1 Overview

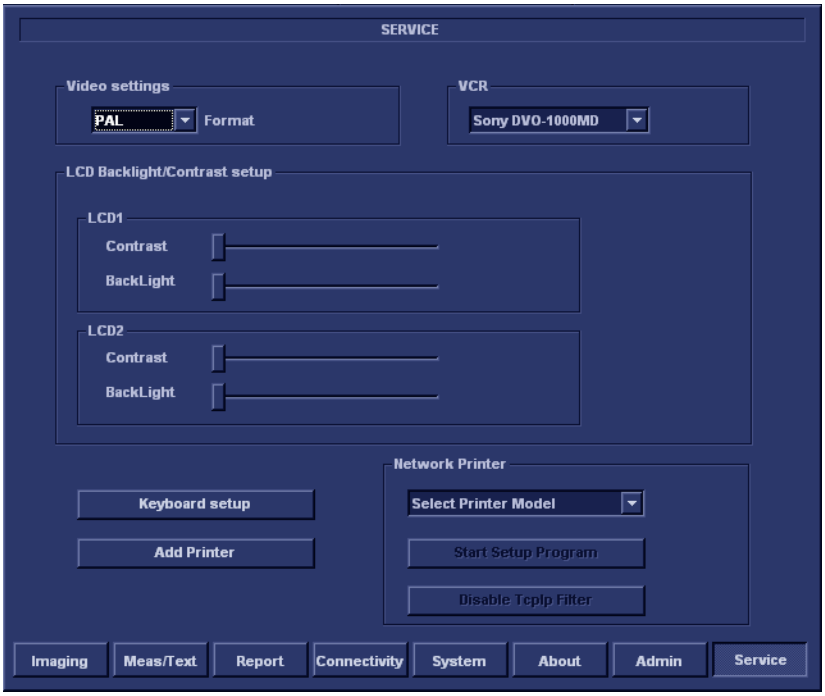
The Service Screen gives you access to:

- Select Video Format to be used by DVD or VCR
- Select DVD or VCR type
- Adjust the Operator Panel LCD’s **Contrast** and **Backlight** Intensity
- Alphanumeric Keyboard Setups
- Printer Setup

3-7-2-2 Open Service Screen

1.) Press **CONFIG** (**F2**) and log on as *ADM*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.

2.) Select **SERVICE** to view the Service Screen, see Figure 3-23 on page 3-33.



Video settings: PAL Format

VCR: Sony DVO-1000MD

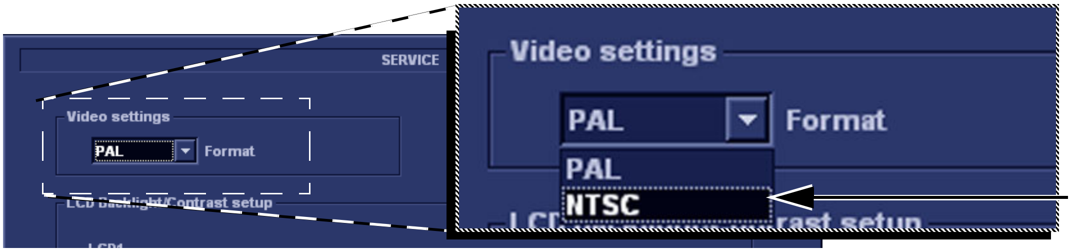
SERVICE
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Network Printer
Select Printer Model
Keyboard setup
Add Printer
Start Setup Program
Disable Tcplp Filter
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Figure 3-23 Service Screen

3-7-2-3 Select Video Format, PAL or NTSC

This selection must correspond to the Video Standard (PAL or NTSC) used by the Video Recorder.

- From the Video Settings drop-down menu, select the correct video format (NTSC or PAL).

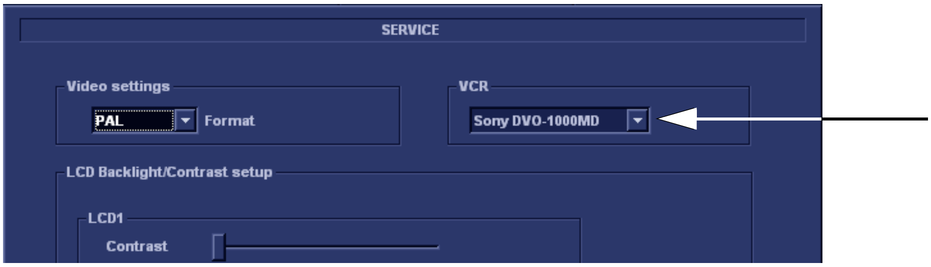

SERVICE
Video settings
PAL
Format
LCD Backlight/Contrast setup
LCD1
Video settings
PAL
Format
PAL
NTSC

Select Video Format

Figure 3-24 Select Video Format

3-7-2-4 Select Video Recorder (DVD or VCR) Type

- Use the **VCR** drop down menu to select the type. See "Approved Internal Peripherals" on page 3-36 for approved video recorders for use with Vivid 7.


SERVICE
Video settings
Format
LCD Backlight/Contrast setup
LCD1
Contrast

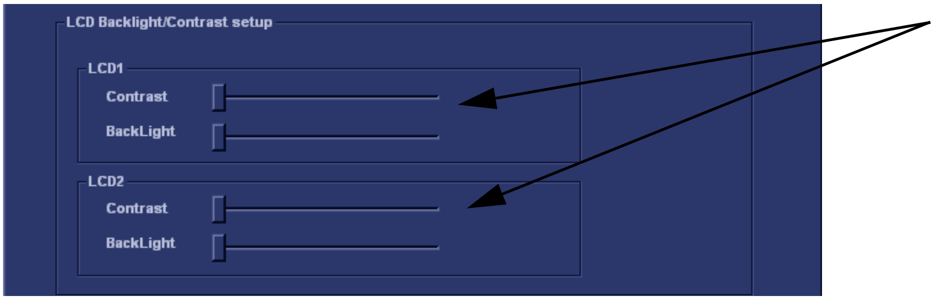
Format: PAL
VCR: Sony DVO-1000MD

SELECT VIDEO PLAYER

Figure 3-25 Select Video Player

3-7-2-5 Adjust Operator Panel LCD's Contrast and Backlight Intensity

- Use the **LCD Contrast** and **LCD Backlight** controls to adjust Contrast and Backlight Intensity for the Operator Panel's (OP's) LCD displays.

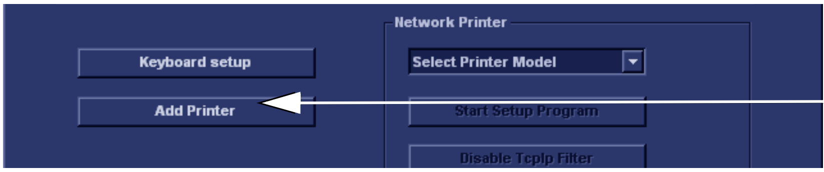

LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight

Adjust LCD Contrast and Backlight Intensity

Figure 3-26 Adjust LCD's Contrast and Backlight Intensity

3-7-2-6 Add Printer

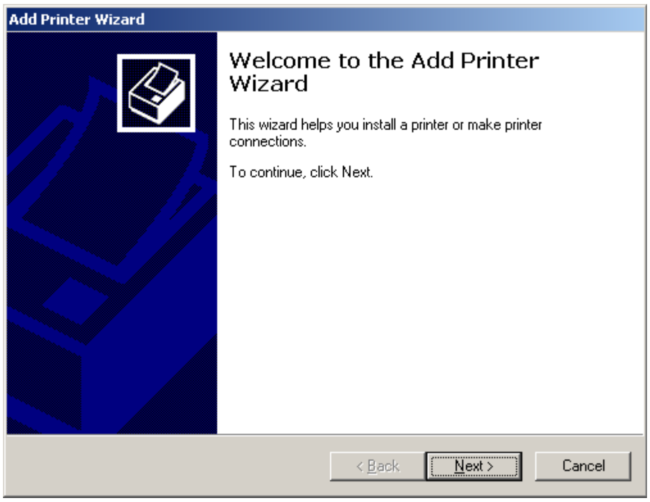
NOTE: *This function may be unavailable for some software versions and it will not always function due to that usually, a special Installation Wizard is to be used. Please follow instructions in the respective printer installation manual for correct printer installation. See 3-7-3 "Optional Peripherals/Peripheral Connection" on page 3-36 for more information.*


Network Printer
Keyboard setup
Add Printer
Select Printer Model
Start Setup Program
Disable TcpIp Filter

Select Add Printer

Figure 3-27 Select Add Printer

1.) Select **ADD PRINTER** to start the Add Printer (Installation) Wizard.


Add Printer Wizard
< Back
Next >
Cancel

Welcome to the Add Printer Wizard

This wizard helps you install a printer or make printer connections.

To continue, click Next.

Figure 3-28 Add Printer Wizard

2.) Follow the instructions in the Wizard to install a new printer.

3-7-3 Optional Peripherals/Peripheral Connection

3-7-3-1 Approved Internal Peripherals

This list covers the internal peripherals approved for Vivid 7:

- Printer, Black & White, Video, SONY.
- Printer, Black & White, Digital, SONY (needs software version v3.0 or above and BEP2).
- Printer, Monochrome, Digital, SONY UP-D897SYN
- Printer, Monochrome, Digital, SONY UP-D895MD (needs software version v3.0 or above and BEP2).
- Printer, Color, Video, SONY, both PAL and NTSC versions are available.
- Printer, Color, Digital, SONY UP-D21MD
- Printer, Color, Digital, SONY UP-D23MD
- DVD Recorder, JVC BD-X201M (introduced for software v6.0)
- VCR, SONY, both PAL and NTSC versions are available.
- VCR, PANASONIC, both PAL and NTSC versions are available.
- VCR, MITSUBISHI HS-MD3000E

See the **Vivid 7 Peripherals Installation Manual**, Direction Number FC294048, for installation instructions for the peripherals listed above.

- MO Drive (option) (mounted inside Back-End Processor).
- CD-R Drive (part of Back-End Processor) (BEP1, BEP2 and BEP2.2)
- CD/DVD Drive (part of Back-End Processor) (BEP3.x and BEP4.x)

NOTICE Vivid 7 with BEP1, BEP2 and BEP2.2 supports CD-R disks. CD-RW disks are not supported.

Vivid 7 with BEP3, BEP3.2 and BEP4.x supports both CD-R and DVD-R disks.

- USB Flash Card, 256 MB (needs software version v4.0 or higher). Install in USB port on front of Vivid 7.

3-7-3-2 External Peripherals (Optional)

The external printers are connected via Ethernet (TCP/IP network).

Color Printer, HP OfficeJet PRO K550

Installation instructions are available in the **Printer Driver Installation Manual for EchoPAC PC and Vivid 7**, Direction Number FC294837.

Color Laser Printer, HP Color LaserJet 3600n

Please use the installation instructions from HP, delivered with the printer.

Software driver installation instructions are available in the **Printer Driver Installation Manual for EchoPAC PC and Vivid 7**, Direction Number FC294837.

Color Printer, HP Inkjet 1200DTN (Replaces HP Inkjet 1100DTN)

Installation instructions are available in the **HP Inkjet 1200 Installation Manual for EchoPAC PC and Vivid 7**, Direction Number FC194654.

Color Printer, HP Inkjet 1100DTN (Obsolete from factory)

Installation instructions are available in the **HP Inkjet 1100 Installation Manual for EchoPAC PC and Vivid 7**, Direction Number EP194599.

Color Printer, HP Deskjet 6127 (Obsolete from factory)

Installation instructions are available in the **HP Deskjet 6127 Installation Manual for EchoPAC PC and Vivid 7**, Direction Number EP194516.

Color Printer, HP Deskjet 990 Cxi Network Printer (Obsolete)

(This printer replaces the EPSON 980N printer, see below.)

Installation instructions are available in the **HP Deskjet 990 Cxi Network Printer Installation Manual**, Direction Number EP194422.

The printer has been delivered in two versions:

- EP100422, 110 VAC.
- EP100423, 220 VAC.

Color Inkjet Printer, EPSON 980N. (Obsolete)

Installation instructions are available in the **EchoPAC PC Service Manual,**
Direction Number EP091298.

3-7-3-2 External Peripherals (Optional) (cont'd)

Lexmark Color LaserWriter Network Printer.

These versions are available:

- 100 VAC:
  - * **Lexmark c762 Color Printer**
  - * **Lexmark c752 Color Printer (Going Obsolete)**
  - * **Lexmark c750 Color Printer (Obsolete)**
- 110 VAC:
  - * **Lexmark c762 Color Printer**
  - * **Lexmark c752 Color Printer (Going Obsolete)**
  - * **Lexmark c750 Color Printer (Obsolete)**
- 220 VAC:
  - * **Lexmark c762 Color Printer**
  - * **Lexmark c752 Color Printer (Going Obsolete)**
  - * **Lexmark c750 Color Printer (Obsolete)**
- Installation of the **Lexmark c762n Color Printer** and **Lexmark c752n Color Printer** is described in **Lexmark c752n/c762n Color Printer Installation Manual**, Direction Number FC194475.
- Installation of the **Lexmark c750n Color Printer** is described in **Lexmark c750 Color Printer Installation Manual**, Direction Number FC194252.

3-7-4 Available Probes

See *Section 9-26 - Probes on page 9-80*.

3-7-5 Video Specification

See *5-8-9 - Video Specifications on page 5-122*.

3-7-6 Software Options Configuration

3-7-6-1 Software Option Installation

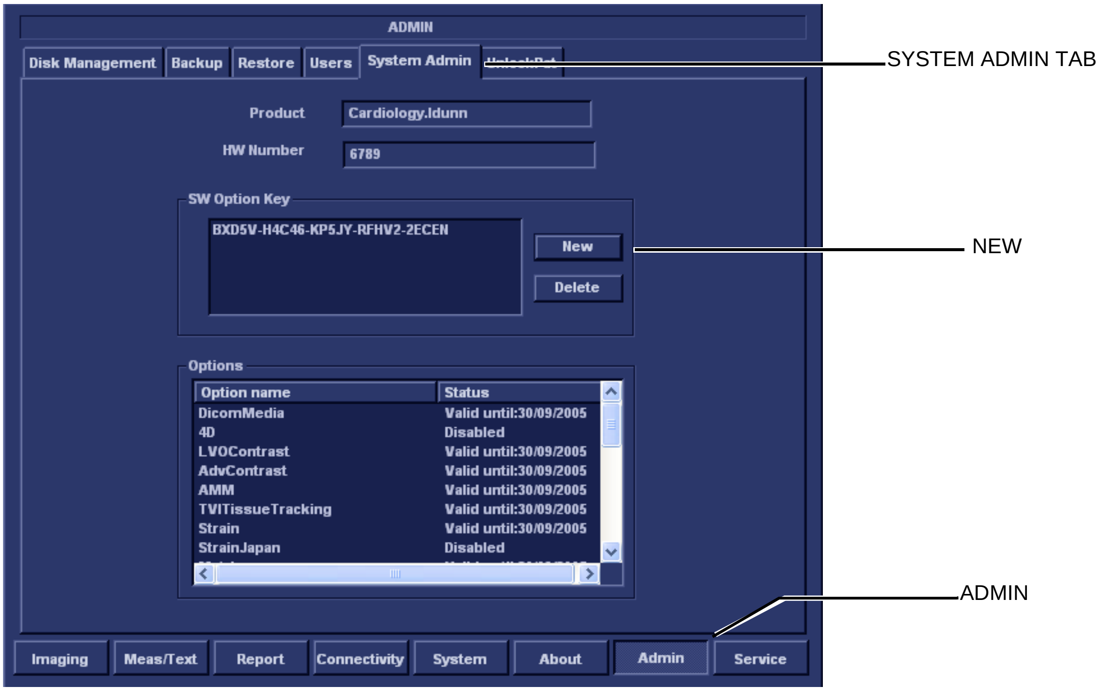
A Password (Software Option String) enables a software option or a combination of software options. This password is specific for each Vivid 7.

3-7-6-2 Install Software Option

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.

2.) Select **ADMIN** (lower part of window),

3.) Select the **SYSTEM ADMIN** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat
SYSTEM ADMIN TAB
SW Option Key
New
Delete
NEW
Options
ADMIN
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Product: Cardiology.ldunn

HW Number: 6789

SW Option Key: BXD5V-H4C46-KP5JY-RFHV2-2ECEN

Option name	Status
DicomMedia	Valid until:30/09/2005
4D	Disabled
LVOContrast	Valid until:30/09/2005
AdvContrast	Valid until:30/09/2005
AMM	Valid until:30/09/2005
TVITissueTracking	Valid until:30/09/2005
Strain	Valid until:30/09/2005
StrainJapan	Disabled

Figure 3-29 System Admin screen

4.) Select **NEW** to open the New Key dialog where you type the Software Option Key (Alphanumeric String).

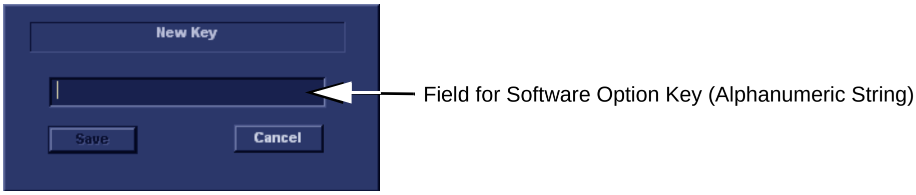

New Key
Save
Cancel
Field for Software Option Key (Alphanumeric String)

Figure 3-30 Type Software Option Key (Alphanumeric string)

3-7-6-2 Install Software Option (cont'd)

⚠ CAUTION **Incorrect password entry will result in loss of system options.**
If password is incorrect, please contact your local GE Service representative or the Online Center.

5.) Type the Password (Software Option Key (Alphanumeric string)).
6.) Select **OK** to save the new setting.
7.) Close the Config window.

Section 3-8
Connectivity Overview

NOTE: *If you are new or unfamiliar to connectivity on Vivid 7, you should read Section 5-15 "Connectivity Theory" on page 5-148 before you continue with the next descriptions and procedures.*

3-8-1 Physical Connection

3-8-1-1 Stand-alone Vivid 7

No network connection needed.

3-8-1-2 "Sneaker Net" Environment

No network connection needed.

3-8-1-3 Connection from Vivid 7 to an EchoPAC PC Workstation

Direct Cable Connection from Vivid 7 to an EchoPAC PC Workstation via a Crossover Cable

You will only need a Crossover Cable for network use to connect the two units this way.

1.) Connect one end of the crossed network cable to the network connector on the Vivid 7.
2.) Connect the other end to the network connector to the EchoPAC PC Workstation, see chapter 3 in the EchoPAC PC Workstation Service Manual.

Connection via a Peer-to-Peer Network

You will need a network hub and one network cable for each unit connected to the hub.

See "Ethernet Switch / Hub" on page 3-133.

Connection via Hospital Network

You will need one network cable to connect the Vivid 7 to a wall outlet on the hospital's network.

3-8-1-4 Connection between a Vivid 7 and a DICOM Server on a Network

You will need one network cable.

1.) Connect one end of the cable to the Ethernet connector on Vivid 7
2.) Connect the other end of the cable to the wall outlet

If a Peer-to-Peer Network is connected to the hospital's network, you may connect the Vivid 7 to Peer-to-Peer Network.

Section 3-9
Connectivity Setup - Software v7.x (BT'08), v6.x, v5.x and v4.x

NOTE: *If connected to a stand-alone network (Peer-to-Peer network with a Vivid 7 scanner, an EchoPAC PC workstation and an optional network printer), you should use default delivery settings.*

3-9-1 Introduction

To be able to use the network functions when connected to a hospital network, the scanner must have a proper network address.

- Before you can set up the scanner, you need to collect some information.
- The "Pre-quote Worksheet for DICOM Network Information" on page 2-14 can be used for gathering this information.
- Typical source for this information is the network administrator.

NOTE: *The remote use of Common Service Platform is not compatible with use of DHCP. If DHCP is turned on, remote diagnostics will be disabled.*

3-9-2 Contents in this Section

- 3-9-3 "Compatibility" on page 3-43
- 3-9-4 "Select TCP/IP Set-up Screen" on page 3-44
- 3-9-5 "Changing the Computer Name, AE Title and/or Port Number (Port No.)" on page 3-45
- 3-9-6 "Set the Scanner's Network Information - S/W v4.2/v5.2/v6.1/v7.x and later" on page 3-48
- 3-9-7 "Set the Scanner's Network Information - S/W v4.0/v4.1/v5.0/v5.1/v6.0" on page 3-50
- 3-9-8 "Advanced Settings" on page 3-51
- 3-9-9 "DHCP Configuration" on page 3-52
- 3-9-10 "Set the Remote Archive's Network Information" on page 3-55
- 3-9-11 "Save the New Settings" on page 3-55
- 3-9-14 "Set Up Connection to a DICOM Server in a Network" on page 3-58
- 3-9-15 "Export Configuration" on page 3-70
- 3-9-16 "Create a New Dataflow" on page 3-75
- 3-9-17 "Query/Retrieve (Q/R) Setup for Software v7.x/v6.x/v5.x/v4.x" on page 3-78
- 3-9-18 "Mapping of Parameters from Vivid 7 to DICOM" on page 3-85

3-9-3 Compatibility

3-9-3-1 Vivid 7 with Software Version v7.x

Vivid 7 with software version v7.x can communicate with:

- EchoPAC PC with software version v7.x or newer.
- Image Vault 4.3 or newer.

3-9-3-2 Vivid 7 with Software Version v6.x

Vivid 7 with software version v6.x can communicate with:

- EchoPAC PC with software version v6.x (use the same, or newer software version as used on the Vivid 7)
- Image Vault 4.1 or newer
- EchoServer 7

3-9-3-3 Vivid 7 with Software Version v5.x

Vivid 7 with software version v5.x can communicate with:

- EchoPAC PC with software version v5.x (use the same, or newer software version as used on the Vivid 7)
- Image Vault 4 or newer
- EchoServer 7

3-9-3-4 Vivid 7 with Software Version v4.x

Vivid 7 with Software Version v4.x can communicate with:

- EchoPAC PC with software version v4.x (use the same, or newer software version as used on the Vivid 7)
- EchoPAC PC with software version v5.x
- Image Vault 4 or newer
- EchoServer 7

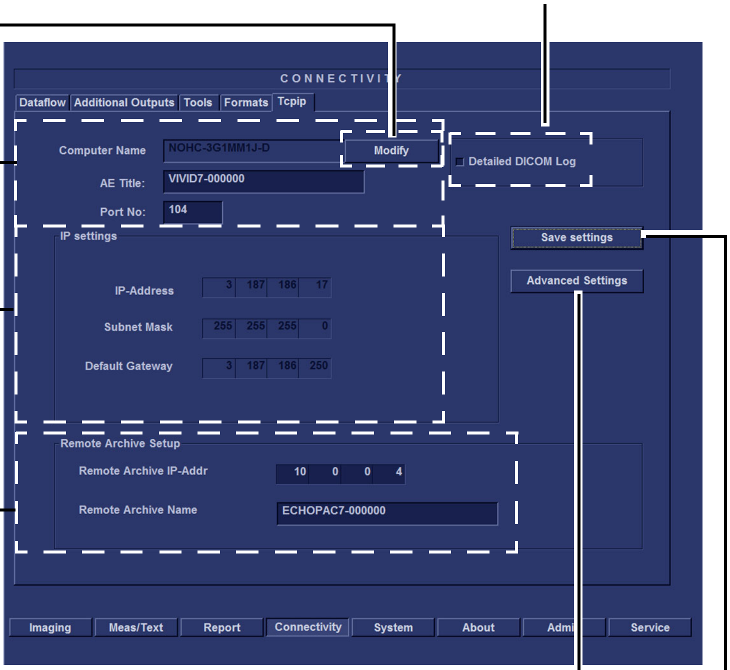
3-9-4 Select TCP/IP Set-up Screen

1.) Press **Config** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) If not already selected, select **Connectivity** from the bottom row of "buttons" on the screen.
3.) Select the **TCP/IP TAB** (it is named **Tcpip**). The resulting screen gives you an overview of many of the network settings for Vivid 7.

⚠ **NOTICE** **If possible, do not change** the **Computer Name.** If you change the Computer Name, you will loose the access to all images in the Local Archive (on the internal hard disk drive). If you must change the Computer Name, please refer to 3-9-5 "Changing the Computer Name, AE Title and/or Port Number (Port No.)" on page 3-45.

SELECT MODIFY TO CHANGE THE COMPUTER NAME

DETAILED DICOM LOG:
SELECT TO TURN **DETAILED DICOM LOG** ON.
(IT WILL BE TURNED OFF AFTER A RESTART)
TURN ON TO TROUBLESHOOT DICOM ISSUES.



Computer Name NOHC-3G1MM1J-D
AE Title: VIVID7-000000
Port No: 104
☐ Detailed DICOM Log

IP settings
IP-Address 3 187 186 17
Subnet Mask 255 255 255 0
Default Gateway 3 187 186 250

Remote Archive Setup
Remote Archive IP-Addr 10 0 0 4
Remote Archive Name ECHOPAC7-000000

COMPUTER NAME / AE TITLE:
FOR Vivid 7, THIS NAME IS ON THE FORM: *VIVIDX-00NNNN*, WHERE "00NNNN" IS A NUMBER (NNNN IS THE SCANNER'S SERIAL NUMBER).
PORT NO:
DEFAULT PORT NUMBER: 104

IP SETTINGS:
IP SETTINGS AREA FOR THE Vivid 7 SCANNER.
DEFAULT SETUP:
IP-ADDRESS: 10.0.0.3
SUBNET MASK: 255.255.255.0
GATEWAY: 0.0.0.0

REMOTE ARCHIVE SETUP AREA:
IP SETTINGS AREA FOR A REMOTE ARCHIVE.
EXAMPLE: *ECHOPAC PC (ECHOPAC7)*.
DEFAULT SETUP:
REMOTE ARCHIVE IP-ADDR: **10.0.0.4**
REMOTE ARCHIVE NAME (THE NAME OF THE PC OR SERVER WITH THE REMOTE ARCHIVE): **ECHOPAC7-000001**

ADVANCED SETTINGS:
USE **ADVANCED SETTINGS** IF YOU NEED TO CHANGE Vivid 7's IP SETTINGS OR TURN DHCP ON OR OFF.

SAVE SETTINGS
SELECT **SAVE SETTINGS** TO ARCHIVE ANY CHANGES YOU HAVE DONE TO THE TCP/IP SETTINGS

Figure 3-31 TCP/IP Overview screen for Vivid 7

3-9-5 Changing the Computer Name, AE Title and/or Port Number (Port No.)

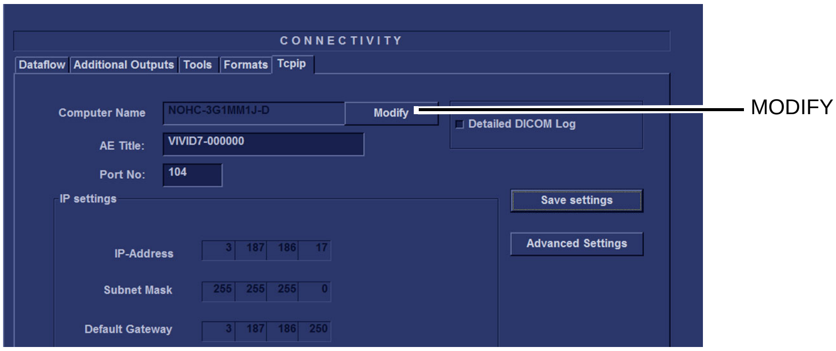
NOTICE **If possible, do not change** the **Computer Name**. If you change the Computer Name, you will loose the access to all images in the Local Archive (on the internal hard disk drive). If you must change the Computer Name, please refer to 3-9-5 "Changing the Computer Name, AE Title and/or Port Number (Port No.)" on page 3-45.

NOTE: To change the ***AE Title*** *and/or* ***Port No.****, please refer to: 3-9-5-3 "Change AE Title and/or Port Number (Port No.)" on page 3-47.*

3-9-5-1 Before you change the Computer Name

Move all images to remote media before you change the Computer Name. See: 4-2-15 "Space Management" on page 4-20, or refer to the User Manual, for a detailed description.

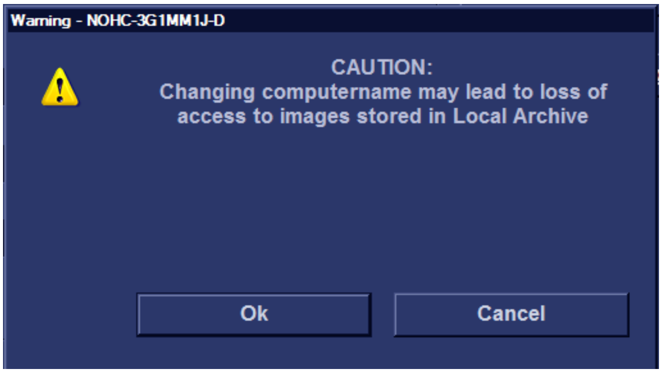
3-9-5-2 Change the Computer Name


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Modify
☐ Detailed DICOM Log
IP settings
Save settings
Advanced Settings
MODIFY

Computer Name: NOHC-3G1MM1J-D
AE Title: VIVID7-000000
Port No: 104
IP-Address: 3 187 186 17
Subnet Mask: 255 255 255 0
Default Gateway: 3 187 186 250

Figure 3-32 Select Modify

1.) When in the **Tcpip** screen, select **Modify**. This will bring up a Warning, see the illustration below.

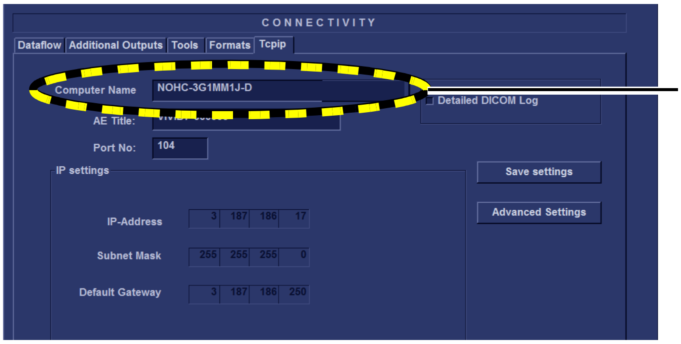

Warning - NOHC-3G1MM1J-D
Ok
Cancel

CAUTION:
Changing computername may lead to loss of access to images stored in Local Archive

Figure 3-33 Warning

2.) Select **Ok** to continue or **Cancel** if you don’t want to change the **Computer Name**.
If you selected **Ok**, the **Computer Name** will be editable.

3-9-5-2 Change the Computer Name (cont'd)


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
☐ Detailed DICOM Log
Save settings
Advanced Settings

Computer Name NOHC-3G1MM1J-D

AE Title:

Port No: 104

IP settings

IP-Address 3 187 186 17

Subnet Mask 255 255 255 0

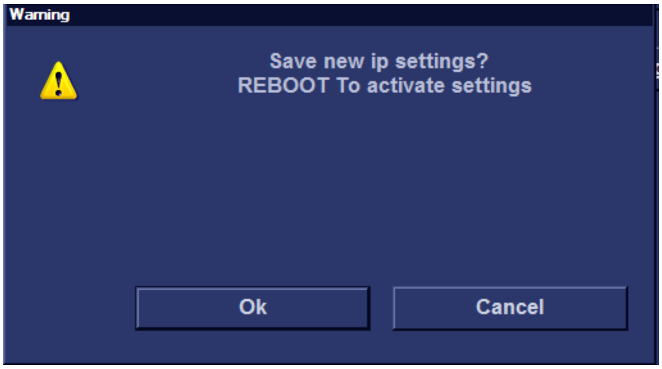
Default Gateway 3 187 186 250

EDIT THE
COMPUTER NAME

Figure 3-34 Edit Computer Name

3.) Edit the **Computer Name**.

4.) Select **Save settings** to store your changes. This will bring up a new Warning screen.


Warning
Ok
Cancel

Save new ip settings?
REBOOT To activate settings

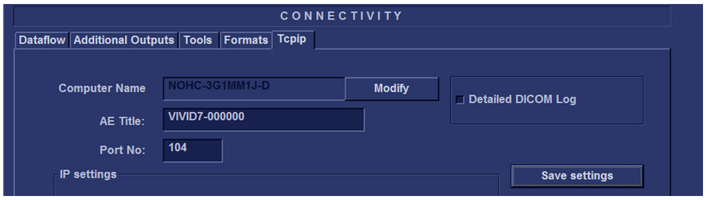
Figure 3-35 Warning

5.) Select **Ok** to save your changes or **Cancel** to return without saving any changes.

6.) Reboot Vivid 7 to activate the settings or continue with other Tcpip set-up tasks.

3-9-5-3 Change AE Title and/or Port Number (Port No.)

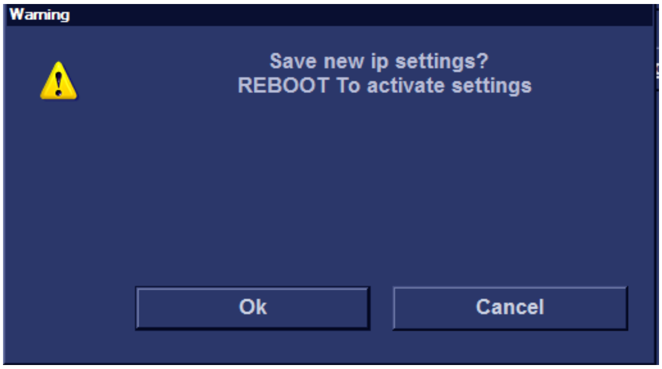
NOTE: *You don't need to use the Modify button when changing AE Title and/or Port No.*


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Modify
Detailed DICOM Log
IP settings
Save settings

Computer Name NOHC-3G1MM1J-D
AE Title: VIVID7-000000
Port No: 104

Figure 3-36 AE Title and Port No.

1.) To change **AE Title** and/or **Port No.**, edit the respective fields.
2.) Select **Save settings** to store your changes. This will bring up a new Warning screen.


Warning
Ok
Cancel

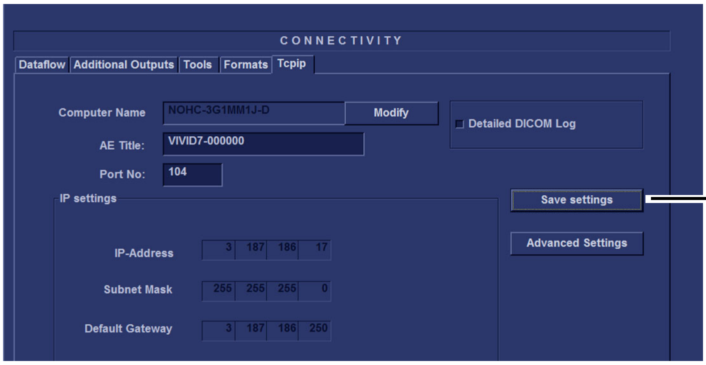
Save new ip settings?
REBOOT To activate settings

Figure 3-37 Warning

3.) Select **Ok** to save your changes or **Cancel** to return without saving any changes.
4.) Reboot Vivid 7 to activate the settings or continue with other Tcpip set-up tasks.

3-9-6 Set the Scanner’s Network Information - S/W v4.2/v5.2/v6.1/v7.x and later

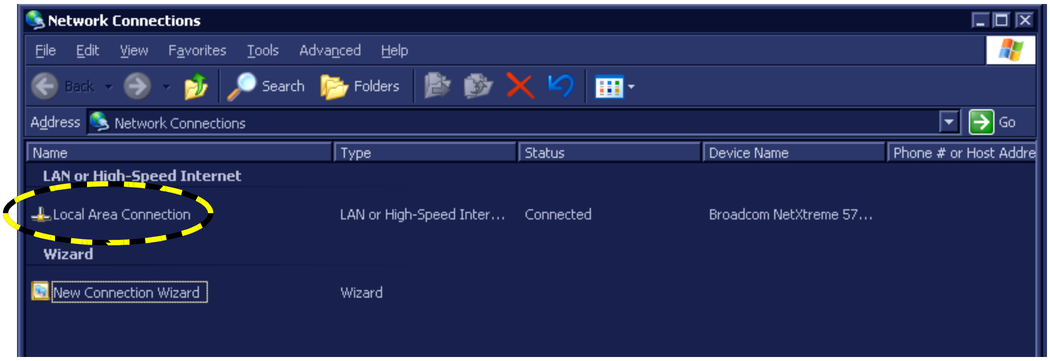
NOTE: *For software version v4.0/v4.1/v5.0/v5.1/v6.0, see: 3-9-7 "Set the Scanner’s Network Information - S/W v4.0/v4.1/v5.0/v5.1/v6.0" on page 3-50*


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Modify
☐ Detailed DICOM Log
Save settings
Advanced Settings
ADVANCED SETTINGS

Computer Name: NOHC-3G1MM1J-D
AE Title: VIVID7-000000
Port No: 104
IP settings
IP-Address: 3 187 186 17
Subnet Mask: 255 255 255 0
Default Gateway: 3 187 186 250

Figure 3-38 Select Advanced Settings

1.) When in the **Tcpip (**TCP/IP) screen, select **Advanced Settings** to display the **Network Connections** screen.


Network Connections
File
Edit
View
Favorites
Tools
Advanced
Help
Back
Search
Folders
Address
Go

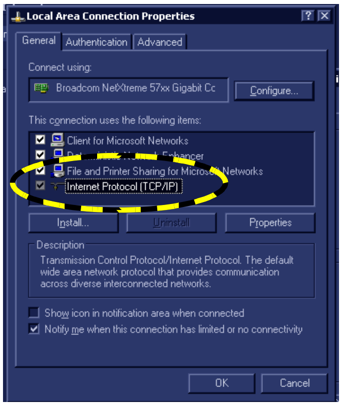
Address: Network Connections

Name	Type	Status	Device Name	Phone # or Host Addre
LAN or High-Speed Internet				
Local Area Connection	LAN or High-Speed Inter...	Connected	Broadcom NetXtreme 57...	
Wizard				
New Connection Wizard	Wizard			

Figure 3-39 Network Connections screen

2.) Right-click **Local Area Connection** and select **Properties** from the pop-up menu**.** This will display the **Local Area Connection Properties** screen.

3-9-6 Set the Scanner’s Network Information - S/W v4.2/v5.2/v6.1/v7.x and later (cont’d)



Local Area Connection Properties

General | Authentication | Advanced

Connect using:

Broadcom NetXtreme 57xx Gigabit Cc

This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol (TCP/IP)

Description

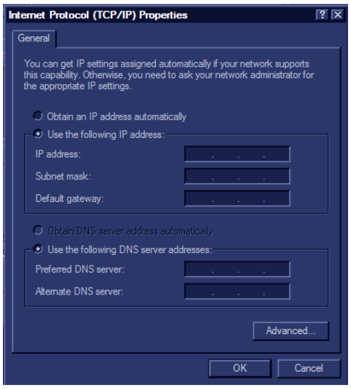
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in notification area when connected

☑ Notify me when this connection has limited or no connectivity

Figure 3-40 Local Area Connection Properties

3.) Select (highlight) **Internet Protocol (TCP/IP)** and select **Properties** to display the **Internet Protocol (TCP/IP) Properties** screen.



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

Figure 3-41 Internet Protocol (TCP/IP) Properties screen

The **Internet Protocol (TCP/IP) Properties** screen is used to set the following parameters:

If using DHCP

Check the **Obtain an IP address automatically** check box.

If not using DHCP

1.) Uncheck the **Obtain an IP address automatically** check box, and enter the:
   - IP Address for Vivid 7. (Default IP Address setting from factory: 10.0.0.3).
   - Subnet Mask for Vivid 7. (Default Subnet Mask setting from factory: 255.255.255.0).
   - IP address for Default Gateway. (Default Gateway setting from factory IP address: 0.0.0.0).

2.) Select **OK** to keep your changes or **Cancel** to close the **Internet Protocol (TCP/IP) Properties** screen without keeping any changes.

3.) Select **OK** to close (and save) the **Local Area Connection Properties** dialog.

4.) Select the “x” in the upper right corner to close the **Network Connections** window.

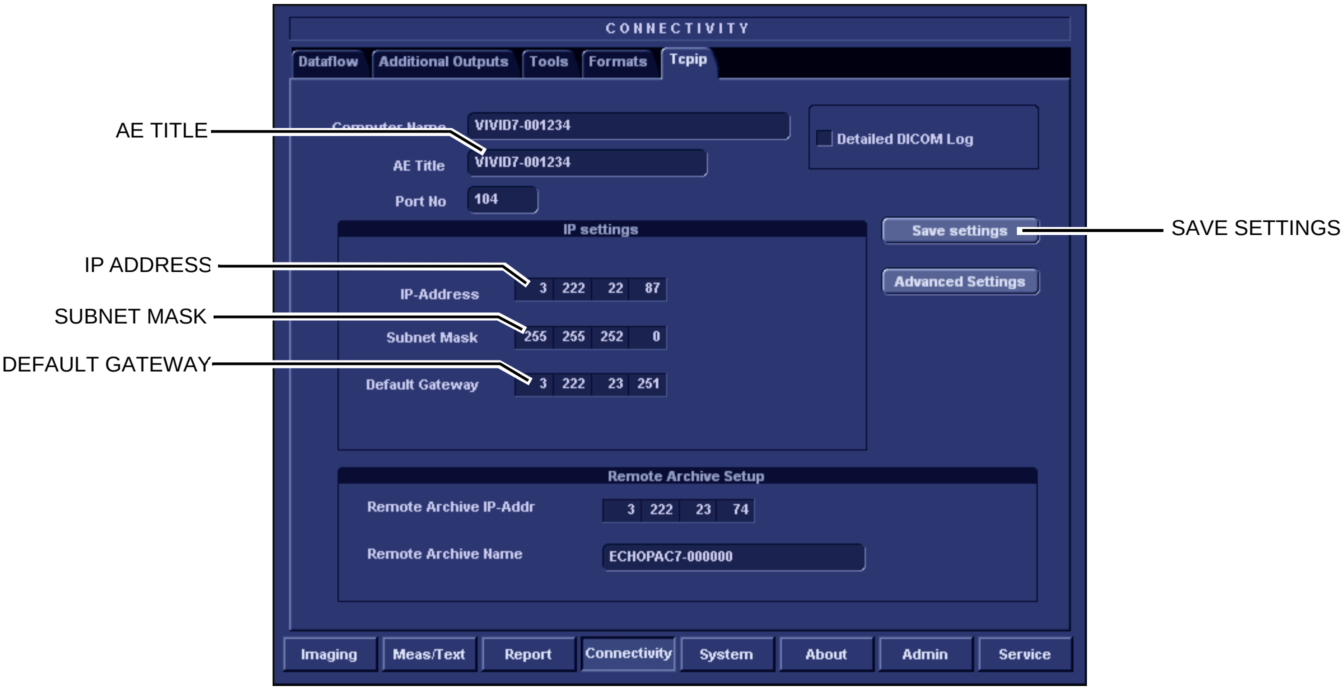
3-9-7 Set the Scanner's Network Information - S/W v4.0/v4.1/v5.0/v5.1/v6.0

In the *IP settings* area of the screen, enter the:

1.) IP Address for scanner. (Default IP Address setting from factory: 10.0.0.3).
2.) Subnet Mask for scanner. (Default Subnet Mask setting from factory: 255.255.255.0).
3.) IP address for Default Gateway. (Default Gateway setting from factory IP address: 0.0.0.0).
4.) Select **Save Settings** to save any changes you have entered.
5.) In addition, AE Title for the scanner must be entered in the DICOM server's setup.

NOTE: The use of DHCP is not supported by the Service Platform, so if DHCP is enabled, the Common Service Platform must be disabled.

.


AE TITLE
IP ADDRESS
SUBNET MASK
DEFAULT GATEWAY
SAVE SETTINGS
CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Advanced Settings
IP settings
Remote Archive Setup
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Computer Name: VIVID7-001234
AE Title: VIVID7-001234
Port No: 104
☐ Detailed DICOM Log
IP-Address: 3 222 22 87
Subnet Mask: 255 255 252 0
Default Gateway: 3 222 23 251
Remote Archive IP-Addr: 3 222 23 74
Remote Archive Name: ECHOPAC7-000000

Figure 3-42 TCP/IP Set-up for Vivid 7

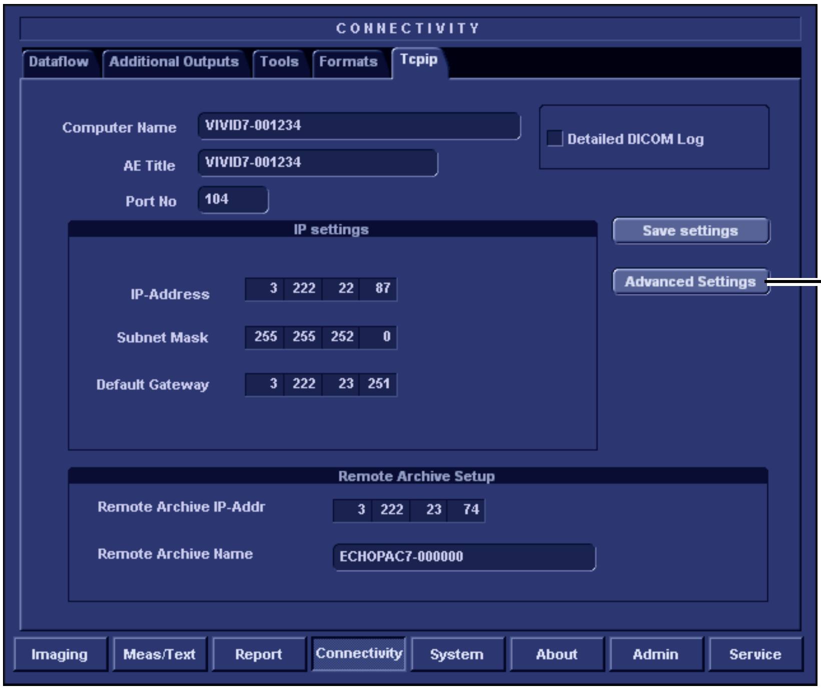
3-9-8 Advanced Settings

NOTE: New for software V4.0 (BT'04).

Advanced Settings give you access to the **Network and Dial-up Connections** screen where you can set up special network connections and adjust settings for network connectivity.

On Vivid 7, Advanced Settings is used to enable/disable DHCP.

.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
IP settings
Remote Archive Setup
Save settings
Advanced Settings
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Computer Name: VIVID7-001234
AE Title: VIVID7-001234
Port No: 104
☐ Detailed DICOM Log
IP-Address: 3 222 22 87
Subnet Mask: 255 255 252 0
Default Gateway: 3 222 23 251
Remote Archive IP-Addr: 3 222 23 74
Remote Archive Name: ECHOPAC7-000000

ADVANCED SETTINGS TO BE USED FOR ENABLING/DISABLING DHCP.

Figure 3-43 Advanced Settings

3-9-9 DHCP Configuration

3-9-9-1 Pre-Requisite

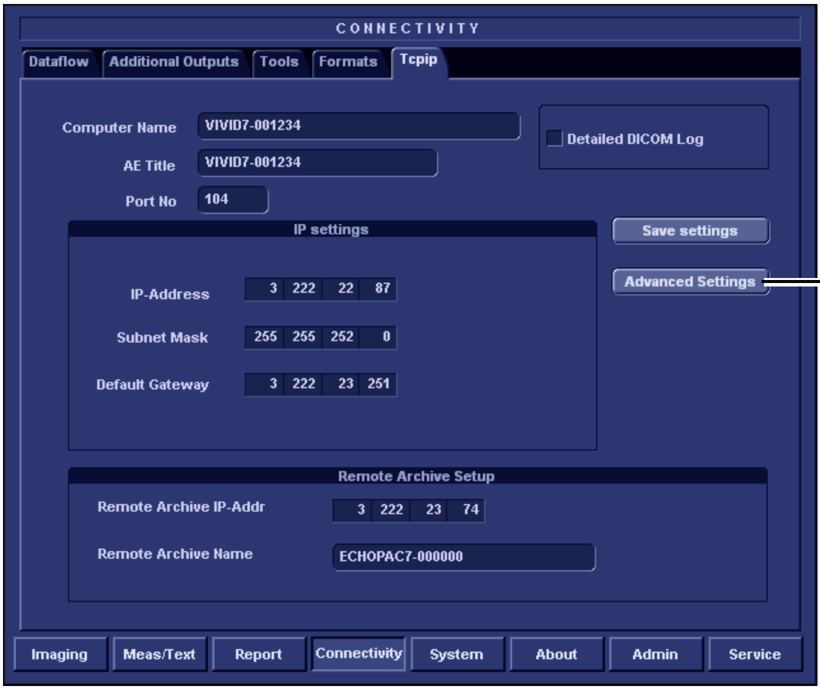
- Software version v4.0 or higher.

NOTE: *The remote connectivity for the Global Service Platform will not function if DHCP is active.*

3-9-9-2 Turn DHCP ON

Follow the instructions below to configure the Vivid 7 to use DHCP

.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Advanced Settings
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Computer Name: VIVID7-001234

AE Title: VIVID7-001234

Port No: 104

☐ Detailed DICOM Log

IP settings

IP-Address: 3 222 22 87

Subnet Mask: 255 255 252 0

Default Gateway: 3 222 23 251

Remote Archive Setup

Remote Archive IP-Addr: 3 222 23 74

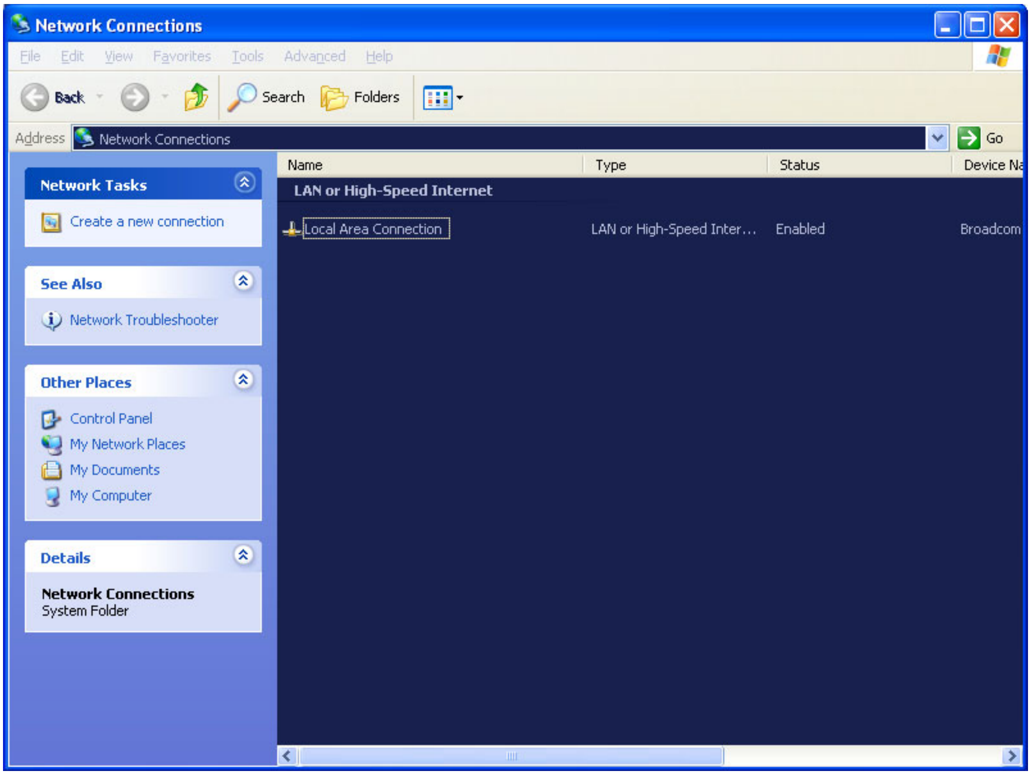
Remote Archive Name: ECHOPAC7-000000

ADVANCED SETTINGS

Figure 3-44 Advanced Settings

1.) When in the TCP/IP screen, select **ADVANCED SETTINGS** to display the **Network and Dial-up Connections** screen, see Figure 3-45 "Network Connections" on page 3-53.

3-9-9-2 Turn DHCP ON (cont'd)


Network Connections
File Edit View Favorites Tools Advanced Help
Back
Search
Folders
Address
Network Connections
Go
Network Tasks
Create a new connection
See Also
Network Troubleshooter
Other Places
Control Panel
My Network Places
My Documents
My Computer
Details

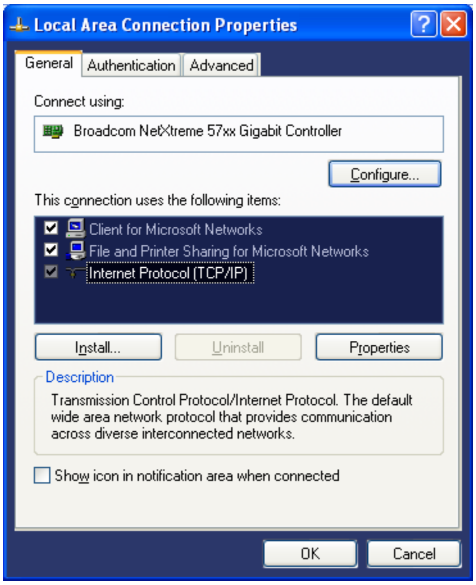
Network Connections
System Folder

Name	Type	Status	Device Na
LAN or High-Speed Internet			
Local Area Connection	LAN or High-Speed Inter…	Enabled	Broadcom

Figure 3-45 Network Connections

2.) Select **Local Area Connection**

3.) Select **Properties** to display the **Local Area Connection Properties**


Local Area Connection Properties
General
Authentication
Advanced
Configure...
Install...
Uninstall
Properties
OK
Cancel

Connect using:

Broadcom NetXtreme 57xx Gigabit Controller

This connection uses the following items:

☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol (TCP/IP)

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

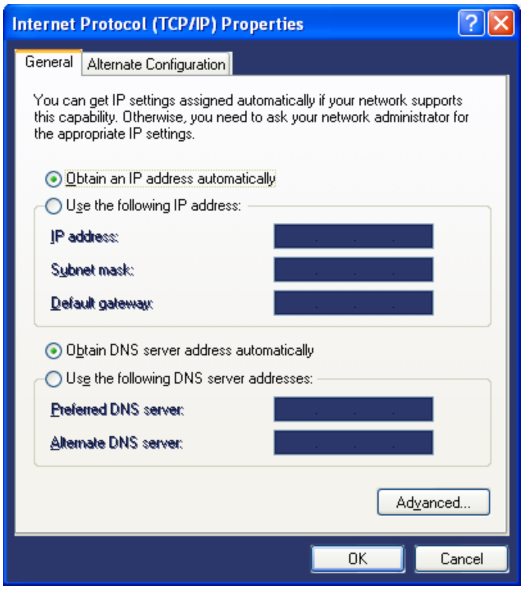
☐ Show icon in notification area when connected

Figure 3-46 Local Area Connection Properties

4.) Scroll down to **Internet Protocol (TCP/IP)** and select it.

3-9-9-2 Turn DHCP ON (cont'd)

5.) Select **Properties**



Internet Protocol (TCP/IP) Properties

General | Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

Figure 3-47 Local Area Connection Status

6.) Select **Obtain an IP address automatically**

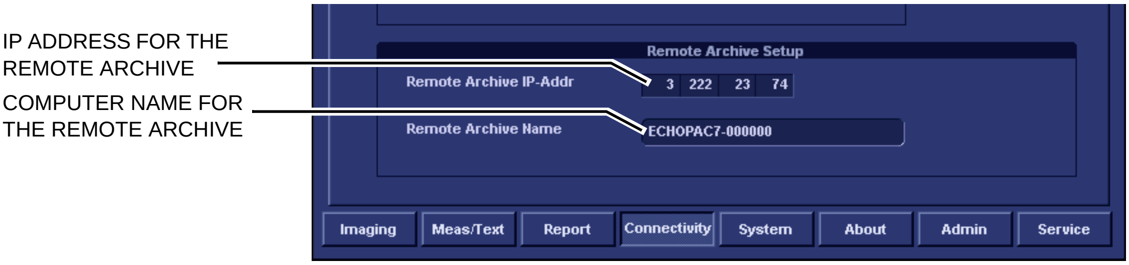
3-9-10 Set the Remote Archive's Network Information

To be able to connect to a remote archive, on a remote computer or server, you must configure Vivid 7 to communicate with it.

In the Remote Archive Setup area of the Tcpip screen, see example in Figure 3-48, enter the;

1.) Remote Archive IP address. (Default IP Address from factory: 10.0.0.4).
2.) Remote Archive Name. (Default Remote Archive Name from factory: ECHOPAC7-000001).

.


IP ADDRESS FOR THE REMOTE ARCHIVE
COMPUTER NAME FOR THE REMOTE ARCHIVE
Remote Archive Setup
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Remote Archive IP-Addr 3 222 23 74

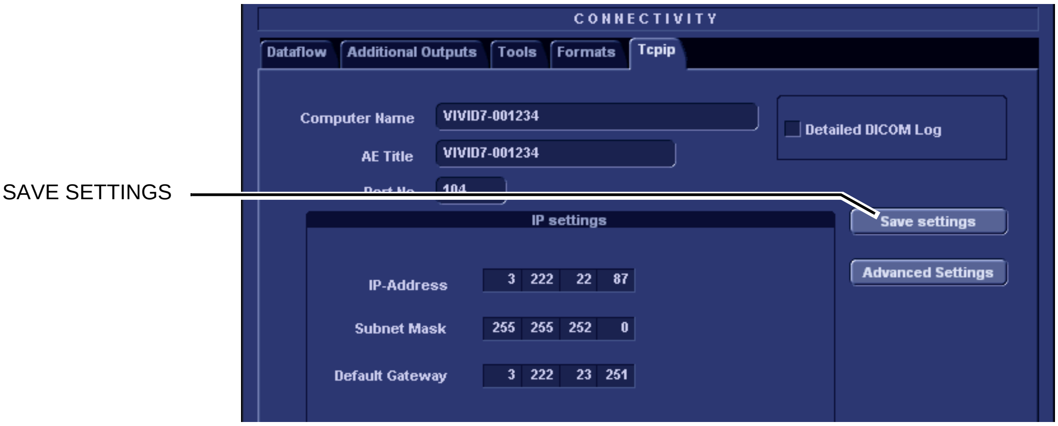
Remote Archive Name ECHOPAC7-000000

Figure 3-48 TCP/IP Set-up for Vivid 7

3-9-11 Save the New Settings

1.) Select **SAVE SETTINGS** to save the new settings.

.


SAVE SETTINGS
CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Advanced Settings
IP settings

Computer Name VIVID7-001234

AE Title VIVID7-001234

Port No 104

☐ Detailed DICOM Log

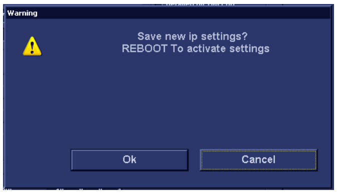
IP-Address 3 222 22 87

Subnet Mask 255 255 252 0

Default Gateway 3 222 23 251

Figure 3-49 Save New TCP/IP settings

A Warning is displayed on the screen, see illustration below.


Warning
Ok
Cancel

Save new ip settings?
REBOOT To activate settings

Figure 3-50 Warning

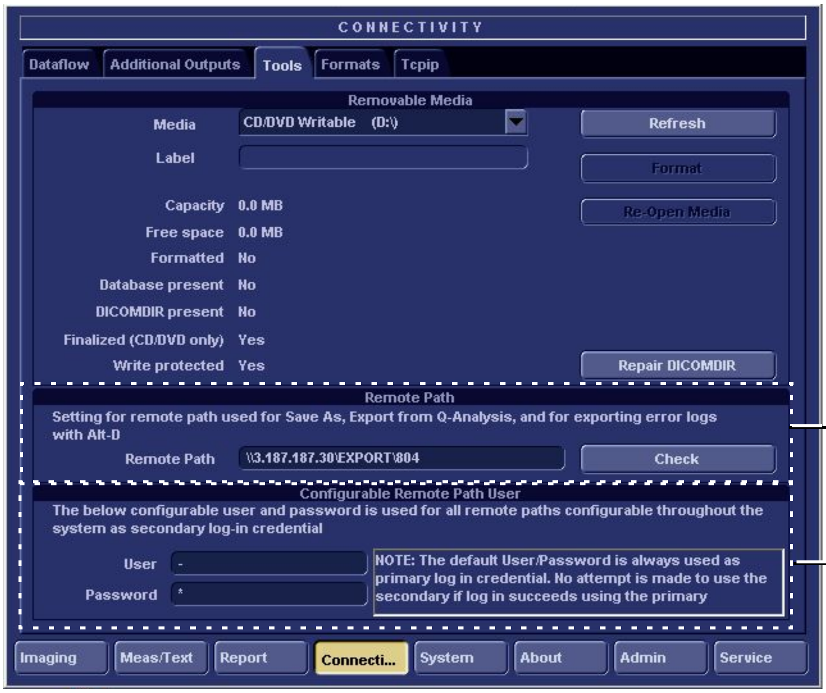
2.) The new settings are saved to a common settings file. After a restart, the settings are also included in other screens.
3.) Restart Vivid 7 to activate the changes.

3-9-12 Remote Path

Remote Path is used for Save As, Export from Q-Analysis, and for exporting error logs with the <Alt+D> command.

Follow this procedure to Configure Vivid 7 to use the **Remote Path**.

1.) Press **Config** (**F2**) and log on as *ADM*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.
2.) If not already selected, select **Connectivity** from the bottom row of “buttons” on the screen.
3.) Select the **Tools** tab.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Removable Media
Refresh
Format
Re-Open Media
Repair DICOMDIR
Remote Path
Check
Configurable Remote Path User
Imaging
Meas/Text
Report
Connecti...
System
About
Admin
Service

Media CD/DVD Writable (D:\)
Label
Capacity 0.0 MB
Free space 0.0 MB
Formatted No
Database present No
DICOMDIR present No
Finalized (CD/DVD only) Yes
Write protected Yes

Setting for remote path used for Save As, Export from Q-Analysis, and for exporting error logs with Alt-D

Remote Path \\3.187.187.30\EXPORT\804

The below configurable user and password is used for all remote paths configurable throughout the system as secondary log-in credential

User -
Password *

NOTE: The default User/Password is always used as primary log in credential. No attempt is made to use the secondary if log in succeeds using the primary

REMOTE PATH

CONFIGURABLE REMOTE PATH USER

Figure 3-51 Tools screen

4.) Enter the **Remote Path**.

Example: \\3.187.187.30\EXPORT\804

5.) Use the **Check** button to verify the connection.

3-9-13 Configurable Remote Path User

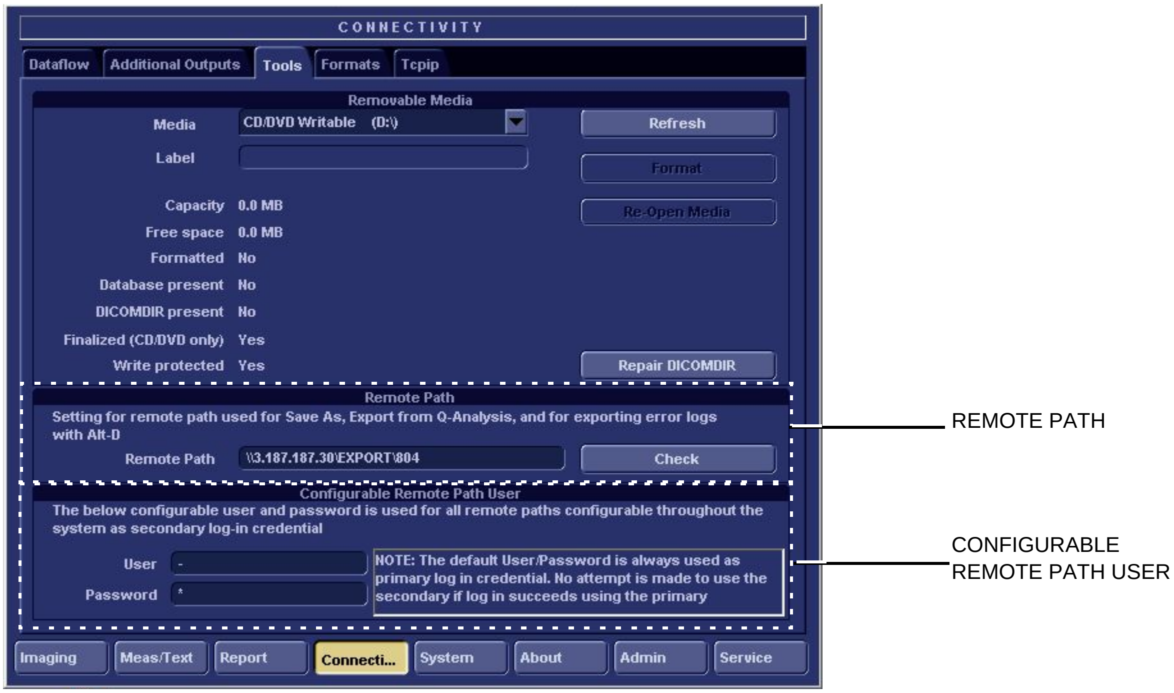
It is possible to set the User and Password for all remote paths as secondary creditials. These settings are only used if the log in with the default User and Password fails. If the log in with the default User and Password succeed, these settings are not used.

Follow these steps to configure the Remote Path User:

1.) Press **Config** (**F2**) and log on as *ADM*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) If not already selected, select **Connectivity** from the bottom row of "buttons" on the screen.

3.) Select the **Tools** tab.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Removable Media
Refresh
Format
Re-Open Media
Repair DICOMDIR
Remote Path
Check
Configurable Remote Path User
Imaging
Meas/Text
Report
Connecti...
System
About
Admin
Service
REMOTE PATH
CONFIGURABLE REMOTE PATH USER

Media: CD/DVD Writable (D:\)
Label:
Capacity: 0.0 MB
Free space: 0.0 MB
Formatted: No
Database present: No
DICOMDIR present: No
Finalized (CD/DVD only): Yes
Write protected: Yes

Setting for remote path used for Save As, Export from Q-Analysis, and for exporting error logs with Alt-D

Remote Path: \\3.187.187.30\EXPORT\804

The below configurable user and password is used for all remote paths configurable throughout the system as secondary log-in credential

User: -
Password: *

NOTE: The default User/Password is always used as primary log in credential. No attempt is made to use the secondary if log in succeeds using the primary

Figure 3-52 Tools screen

4.) Enter the **Secondary User** and **Password** in the assigned fields.

3-9-14 Set Up Connection to a DICOM Server in a Network

In this case the Vivid 7 is configured to work with DICOM servers in a network environment. Images are first saved on the local image buffer on the scanner. At the end of the examination the images are sent to the DICOM server via a DICOM spooler and to the local database, depending on dataflows.

This scenario requires that the scanner is configured to be connected to DICOM servers as described below.

3-9-14-1 Overview

To connect to the DICOM server, the following information has to be entered in the scanner:

- The DICOM server IP address.
- The DICOM server port number.
- The DICOM server AE title (the server application's name).
- Name of Device.

3-9-14-2 DICOM Server IP Address Setting on the Scanner

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) Select **CONNECTIVITY** (in the lower part of the window).
3.) Select the **DATAFLOW** tab.
4.) Select the arrow to the right for the Name field to list all dataflows in a pull-down menu, see Figure 3-53.

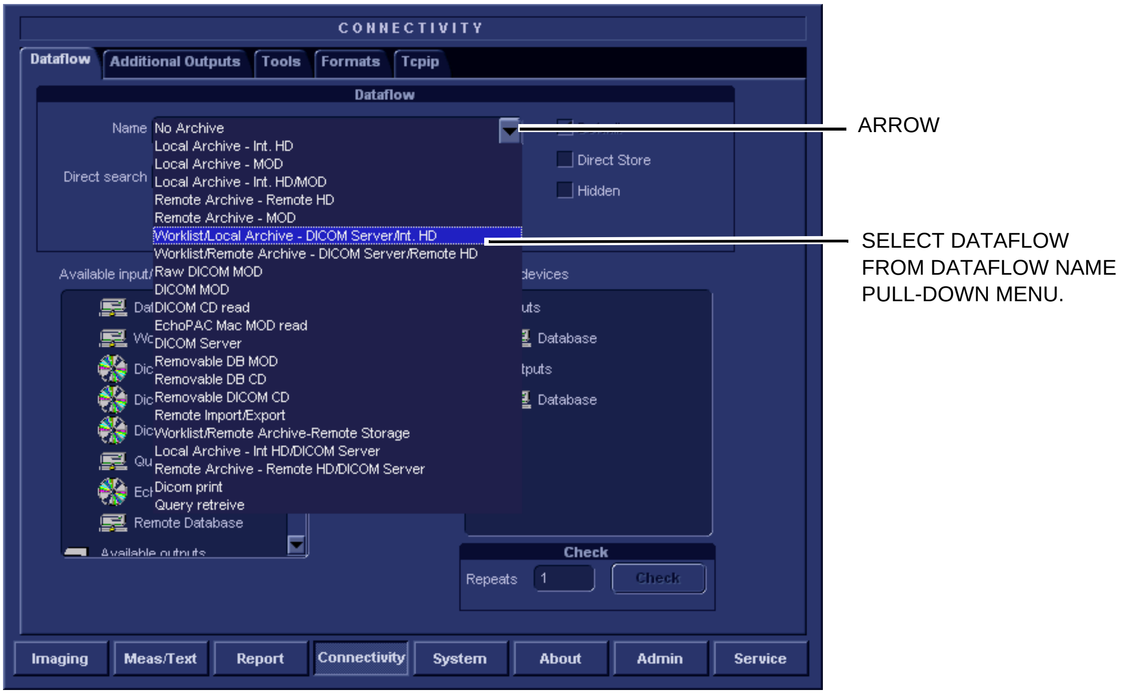

CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Name
Direct search
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote HD
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable DB MOD
Removable DB CD
Removable DICOM CD
Remote Import/Export
Worklist/Remote Archive-Remote Storage
Local Archive - Int HD/DICOM Server
Remote Archive - Remote HD/DICOM Server
Dicom print
Query retreive
Remote Database
Direct Store
Hidden
Database
Database
Check
Repeats
1
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service
ARROW
SELECT DATAFLOW FROM DATAFLOW NAME PULL-DOWN MENU.

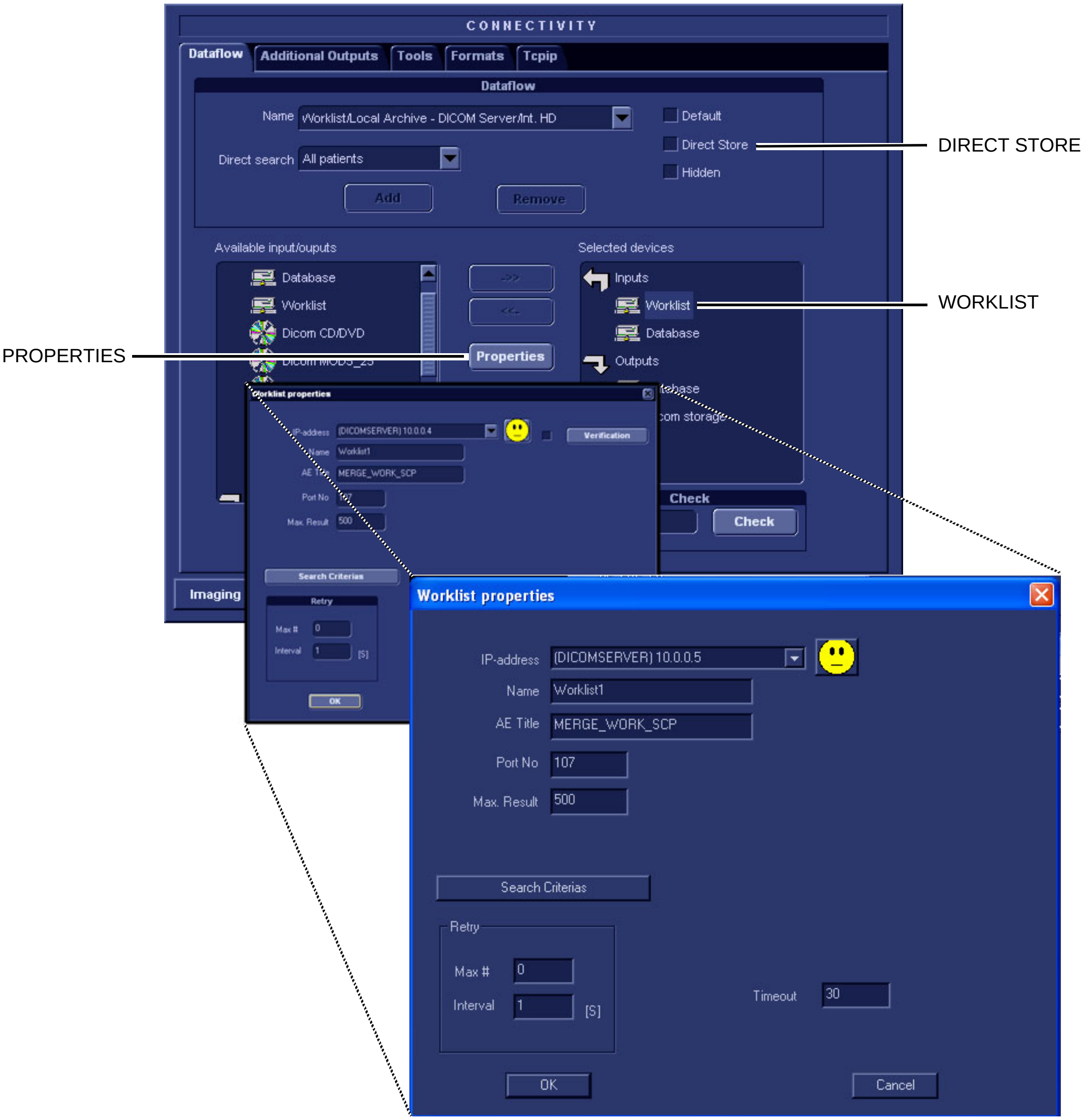
Figure 3-53 Select Dataflow

5.) Select the dataflow you want to configure from the Dataflow Name pull-down list, see Figure 3-53.

3-9-14-2 DICOM Server IP Address Setting on the Scanner (cont'd)

In Figure 3-54, the selected flow, **Worklist/Local Archive - DICOM Server/Int. HD**, is shown. Setup of other dataflows are similar to this example.

6.) Select **Worklist** (so it is highlighted) and then select **Properties** to display the Properties dialog.



Name: Worklist/Local Archive - DICOM Server/Int. HD

Direct search: All patients

☐ Default
☐ Direct Store
☐ Hidden

Worklist properties

IP-address: (DICOMSERVER) 10.0.0.5

Name: Worklist1

AE Title: MERGE_WORK_SCP

Port No: 107

Max. Result: 500

Retry: Max # 0, Interval 1 [S]

Timeout: 30

CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Add
Remove
Available input/ouputs
Database
Worklist
Dicom CD/DVD
Selected devices
Inputs
Outputs
Properties
Check
Imaging
Verification
Search Criterias
OK
Cancel
DIRECT STORE
WORKLIST
PROPERTIES

Figure 3-54 Worklist/Local Archive - DICOM Server/Int. HD flow

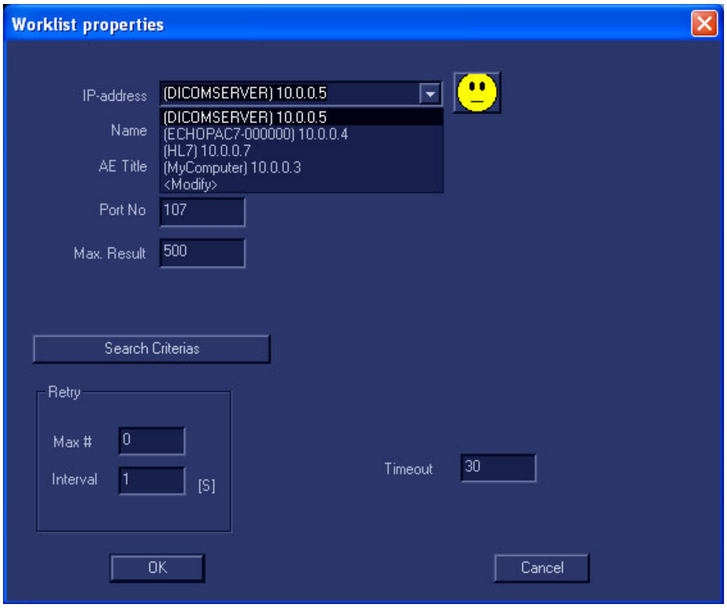
If **Direct Store** is enabled, the image will go to the DICOM server immediately after it is acquired. You will need to verify that the DICOM server is capable of keeping the connection open for the time it takes to complete an examination.

3-9-14-2 DICOM Server IP Address Setting on the Scanner (cont'd)

7.) Select the IP-Address down-arrow to choose the Worklist Server from the pull-down menu.

NOTE: *It is not possible to change the setting in the IP-Address field by editing it. See description below, starting with step 8, to change the setting.*

DO NOT SELECT THE **SEARCH CRITERIAS** BUTTON IF NOT TOLD SO BY THE ONLINE CENTER.


Worklist properties
Name
AE Title
(DICOMSERVER) 10.0.0.5
(ECHOPAC7-000000) 10.0.0.4
(HL7) 10.0.0.7
(MyComputer) 10.0.0.3
<Modify>
Search Criterias
Retry
OK
Cancel

IP-address (DICOMSERVER) 10.0.0.5
Port No 107
Max. Result 500
Max # 0
Interval 1 [S]
Timeout 30

Figure 3-55 DICOM Server's Properties dialog

8.) Follow the steps below to change the IP-Address settings:

a.) From the **Ip-Address** pull-down menu, select **<Modify>** to display the **IPs** dialog.

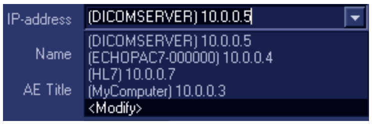
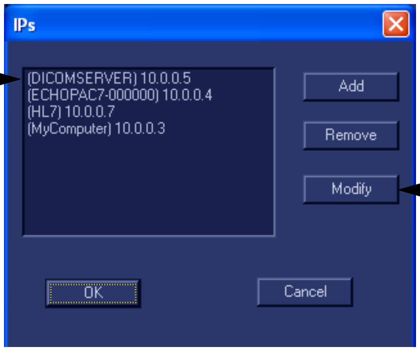

IP-address
Name
AE Title
(DICOMSERVER) 10.0.0.5
(DICOMSERVER) 10.0.0.5
(ECHOPAC7-000000) 10.0.0.4
(HL7) 10.0.0.7
(MyComputer) 10.0.0.3
<Modify>

Figure 3-56 Select <Modify>

b.) Select the server you want to modify from the **IPs** dialog and then select **Modify**.

SELECT SERVER

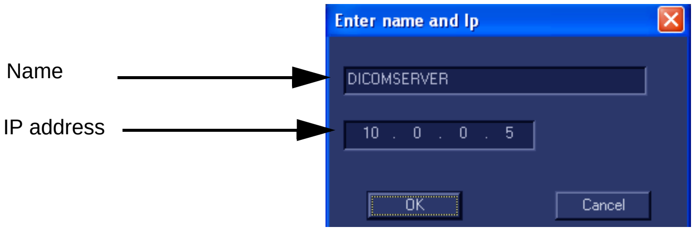

IPs
(DICOMSERVER) 10.0.0.5
(ECHOPAC7-000000) 10.0.0.4
(HL7) 10.0.0.7
(MyComputer) 10.0.0.3
Add
Remove
Modify
OK
Cancel

MODIFY

Figure 3-57 Select the server to modify

3-9-14-2 DICOM Server IP Address Setting on the Scanner (cont'd)

c.) Edit the name and/or the IP address of the server, see Figure 3-58.

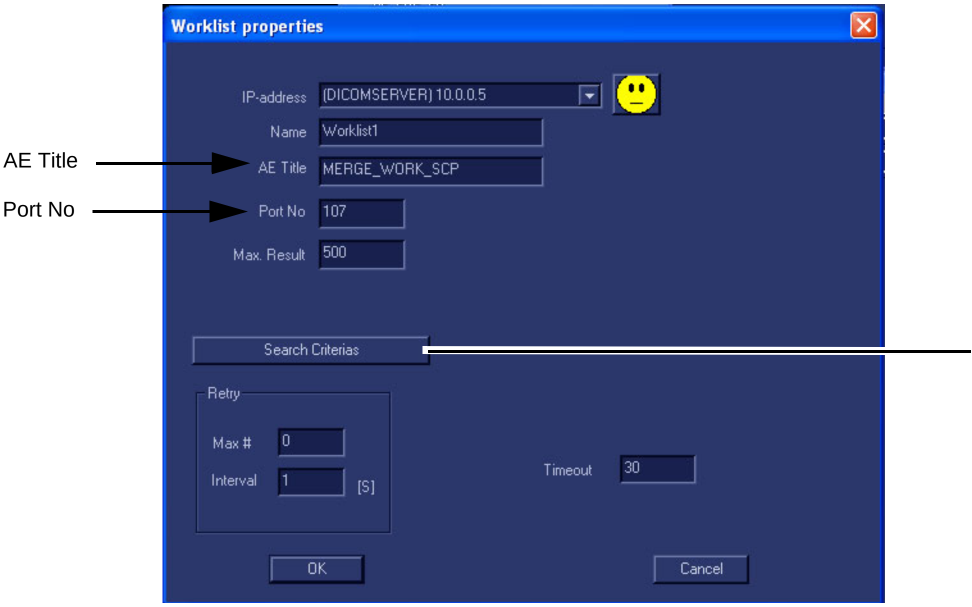

Name
IP address
Enter name and Ip
OK
Cancel

Name: DICOMSERVER
IP address: 10 . 0 . 0 . 5

Figure 3-58 Edit Name and/or IP address

d.) Select **OK** to save the new settings and close the dialog.

e.) Select **OK** to close the IPs dialog to return to the Properties dialog.


AE Title
Port No
Worklist properties
Search Criterias
Retry
OK
Cancel

IP-address: (DICOMSERVER) 10.0.0.5
Name: Worklist1
AE Title: MERGE_WORK_SCP
Port No: 107
Max. Result: 500
Max #: 0
Interval: 1 [S]
Timeout: 30

DO NOT SELECT THE **SEARCH CRITERIA** BUTTON IF NOT TOLD SO BY THE ONLINE CENTER.

Figure 3-59 DICOM Server's Properties dialog

f.) Enter the DICOM server AE Title. This entry is case sensitive and must match exactly.

g.) Enter the DICOM server Port.No (Port Number)

h.) Select **OK** to close the Worklist properties dialog and save changes.

3-9-14-3 Verify the Network Connection to a Device

Follow the Steps Below to do a First Test (TCP-IP Ping) of the Connection

1.) Select the “Smiley” button to Ping the server.

NOTE: *The smiley checks if the remote server is accessible (ping). It is not a DICOM Echo (DICOM ping), so it does not check AE title or port number.*

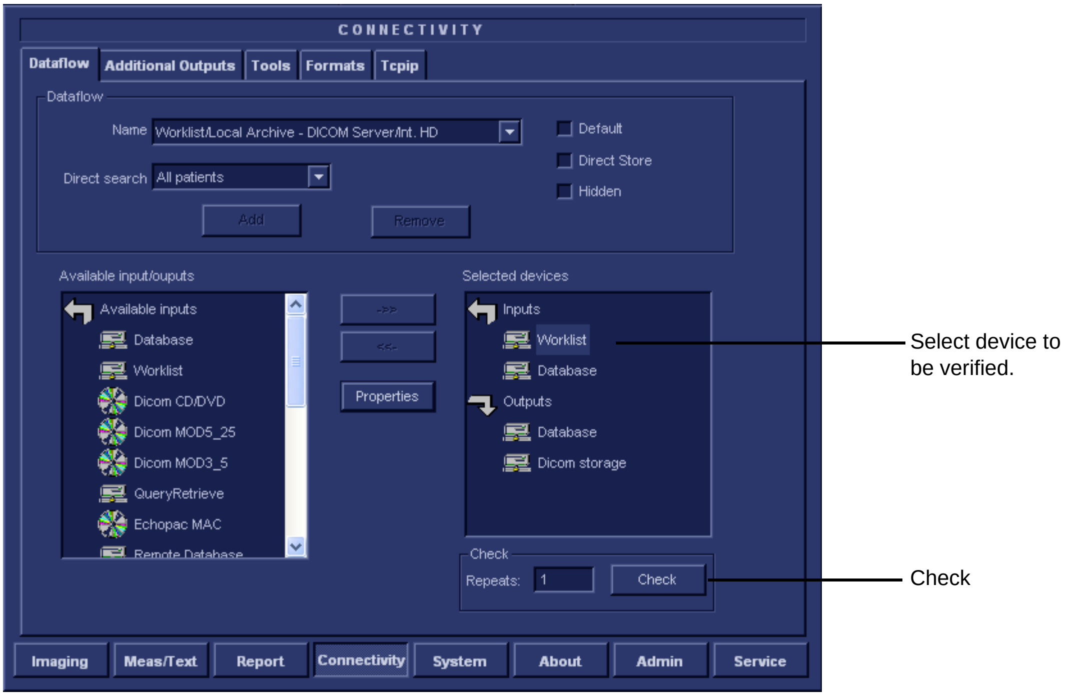
2.) If the network connection to the server is OK, it will be illustrated by a smiling “Smiley” ☺.
A sad Smiley indicates that the network connection is failing.
Typical causes:

- Network cable not connected.
- Configuration error(s).

3-9-14-4 Verify the Connection to a Device

1.) Select (highlight) the device you want to verify the connection to.

NOTE: *You can only check one device at a time.*


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Default
Direct Store
Hidden
Add
Remove
Available input/ouputs
Available inputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
->>
<<-
Properties
Selected devices
Inputs
Worklist
Database
Outputs
Database
Dicom storage
Check
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Name: Worklist/Local Archive - DICOM Server/Int. HD

Direct search: All patients

Repeats: 1

Select device to be verified.

Check

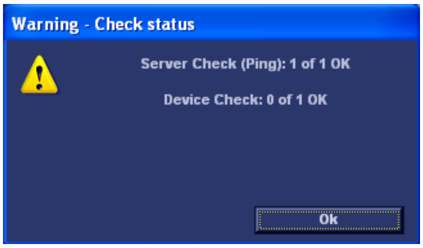
Figure 3-60 Verify connection to a device

2.) Select **Check** to start the verification process of the connection to the device.
The verification process may use some amount of time (several seconds).
When done, a Warning may be displayed on screen for some seconds. When the Warning has closed, a sign is displayed in front of the device, indicating if the test passed (green check-mark) or failed (red X).

3-9-14-4 Verify the Connection to a Device (cont'd)

NOTE: If the Check button fails directly, the AE Title is probably wrong.
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

In the illustration below, the message indicates that the pinging of the server worked fine (line 1), but the application on the server didn't respond (line 2).

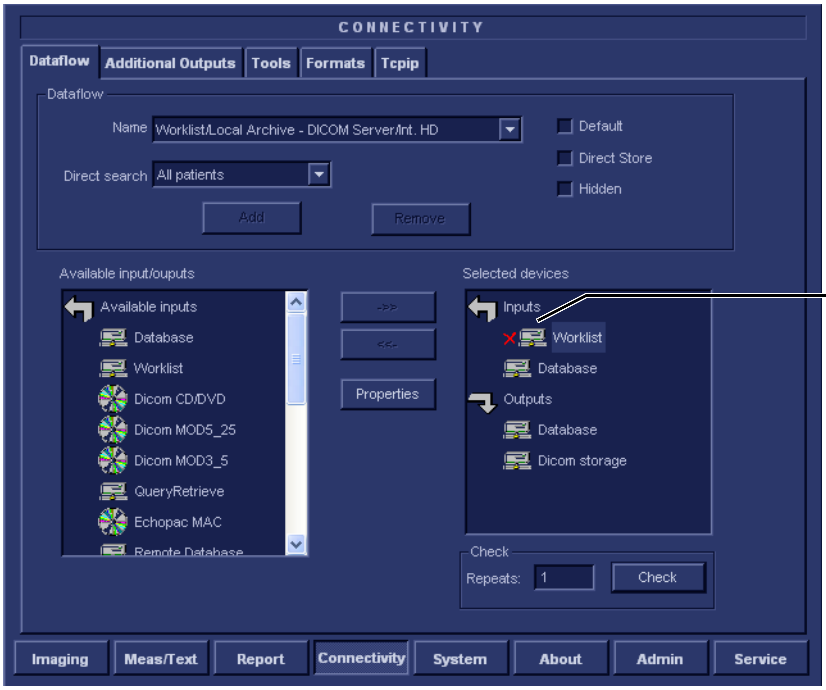


Warning - Check status

Server Check (Ping): 1 of 1 OK

Device Check: 0 of 1 OK

Figure 3-61 Warning - Check status



CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available input/ouputs
Available inputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
->>
<<-
Properties
Selected devices
Inputs
Worklist
Database
Outputs
Database
Dicom storage
Check
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Name: Worklist/Local Archive - DICOM Server/Int. HD

Direct search: All patients

☐ Default

☐ Direct Store

☐ Hidden

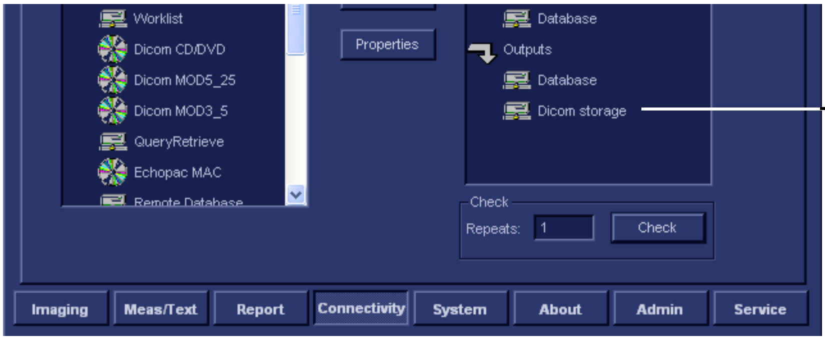
Repeats: 1

A green check-mark indicates that the test passed.
A red cross, as illustrated, indicates that the connection failed.

Figure 3-62 Verification result

3-9-14-5 DICOM Storage Setup

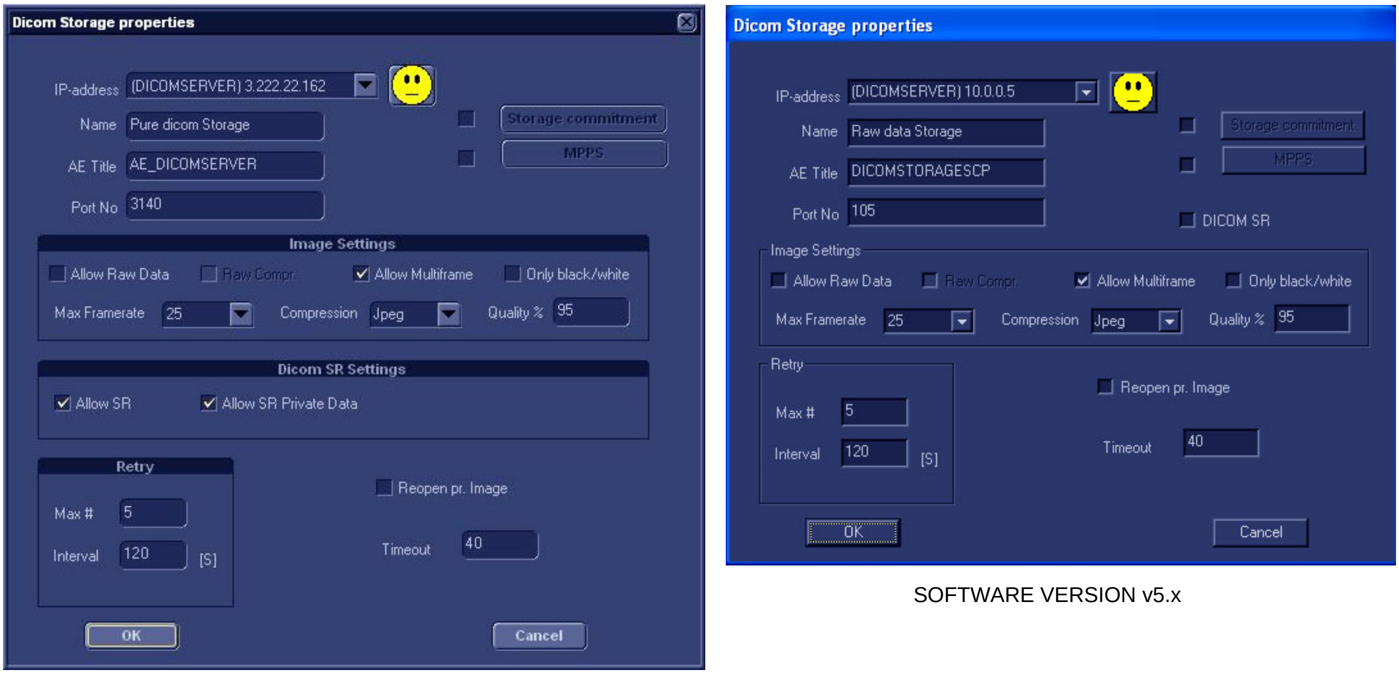
1.) Select **Dicom storage**.


Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
Properties
Database
Outputs
Database
Dicom storage
Check
Repeats: 1
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

DICOM STORAGE

Figure 3-63 Select Dicom storage

2.) Select Properties to display the **DICOM Storage properties** screen.



Dicom Storage properties

IP-address (DICOMSERVER) 3.222.22.162
Name Pure dicom Storage
AE Title AE_DICOMSERVER
Port No 3140
☐ Storage commitment
☐ MPPS

Image Settings
☐ Allow Raw Data ☐ Raw Compr. ☑ Allow Multiframe ☐ Only black/white
Max Framerate 25 Compression Jpeg Quality % 95

Dicom SR Settings
☑ Allow SR ☑ Allow SR Private Data

Retry
Max # 5
Interval 120 [S]
☐ Reopen pr. Image
Timeout 40

SOFTWARE VERSION v6.x and v7.x

Dicom Storage properties

IP-address (DICOMSERVER) 10.0.0.5
Name Raw data Storage
AE Title DICOMSTORAGESCP
Port No 105
☐ Storage commitment
☐ MPPS
☐ DICOM SR

Image Settings
☐ Allow Raw Data ☐ Raw Compr. ☑ Allow Multiframe ☐ Only black/white
Max Framerate 25 Compression Jpeg Quality % 95

Retry
Max # 5
Interval 120 [S]
☐ Reopen pr. Image
Timeout 40

SOFTWARE VERSION v5.x

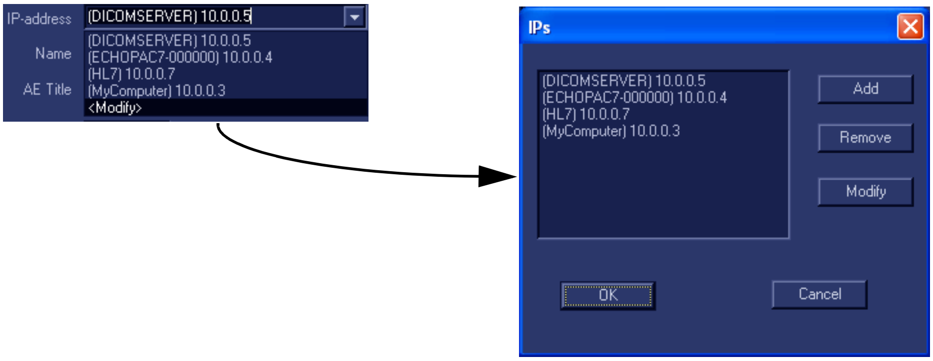
Figure 3-64 DICOM Storage Properties

3-9-14-6 DICOM Storage Properties Adjustments

IP-address

1.) Select the down-arrow at the *IP-Address* pull-down menu to select the *DICOM Storage server*.

2.) Select **<modify>** from the pull-down menu if you need to modify the server's parameters or add a new server. This will bring up the **IPs** dialog.



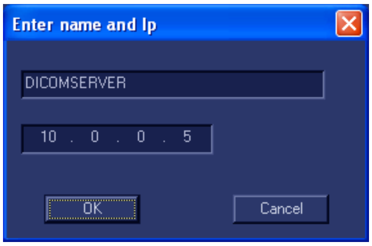
IP-address (DICOMSERVER) 10.0.0.5

Name
AE Title
(DICOMSERVER) 10.0.0.5
(ECHOPAC7-000000) 10.0.0.4
(HL7) 10.0.0.7
(MyComputer) 10.0.0.3
<Modify>
IPs
(DICOMSERVER) 10.0.0.5
(ECHOPAC7-000000) 10.0.0.4
(HL7) 10.0.0.7
(MyComputer) 10.0.0.3
Add
Remove
Modify
OK
Cancel

Figure 3-65 IP Adjustments

If no changes are needed, continue with step 7.

3.) To modify any of the settings, select the server you want to modify, and then select **Modify**. This will bring up the **Enter name and Ip** dialog.



DICOMSERVER

10 . 0 . 0 . 5

Enter name and Ip
OK
Cancel

Figure 3-66 The IPs dialog

4.) In the **Enter name and Ip** dialog you can modify the server's name and IP-address.

- Select **OK** to save the new settings and close the dialog.
- **Select Cancel** to close the dialog without saving the changes.

5.) If you want to add a new server, select **Add** in the **IPs** dialog.

   a.) Type the server's name and IP-address in the **Enter name and Ip** dialog.

   b.) Select **OK** to save the new settings and close the dialog. **Cancel** will close the dialog without saving the changes.

6.) Follow these steps if you want to delete any of the servers from the list:

   a.) Select the server you want to delete, and then select **Delete**. This will bring up a warning where you are asked if you want to delete the server from the list.

   b.) Select **OK** to confirm or **Cancel** if you don't want to delete the server.

3-9-14-6 DICOM Storage Properties Adjustments (cont'd)

7.) Next, verify the other settings and parameters as described below.

Name

Raw data Storage - Name of service.

AE Title

DICOMSTORAGESCP - The DICOM server's AE Title.

Port No

Verify / set the DICOM server's **Port Number**.

Image Settings

- Allow Raw Data - default ON (checked)
- Raw Compr. - default OFF (unchecked)
- Allow Multiframe - default ON (checked)
- Only Black and White - default OFF (unchecked)
- Max Framerate - The pull-down menu gives you these choices;
  - 25 - 25 pictures per second
  - 30 - 30 pictures per second
  - Full - the scanning frame rate
- Compression - The pull-down menu gives you these choices;
  - Jpeg - Jpeg - JPEG/JPG compression (Default). JPEG is not lossless.
  - None - (un-compressed data with huge files)
  - Rle - Run Length Encoding. This is lossless compression.
- Quality % - Set the wanted quality %. Default value is 95%.
  - If files are stored with a quality lower than 95% they will occupy less space, but loose some quality.
  - If files are stored with a quality above 95% thee files will grow much bigger without almost no quality change.

3-9-14-6 DICOM Storage Properties Adjustments (cont'd)

DICOM SR

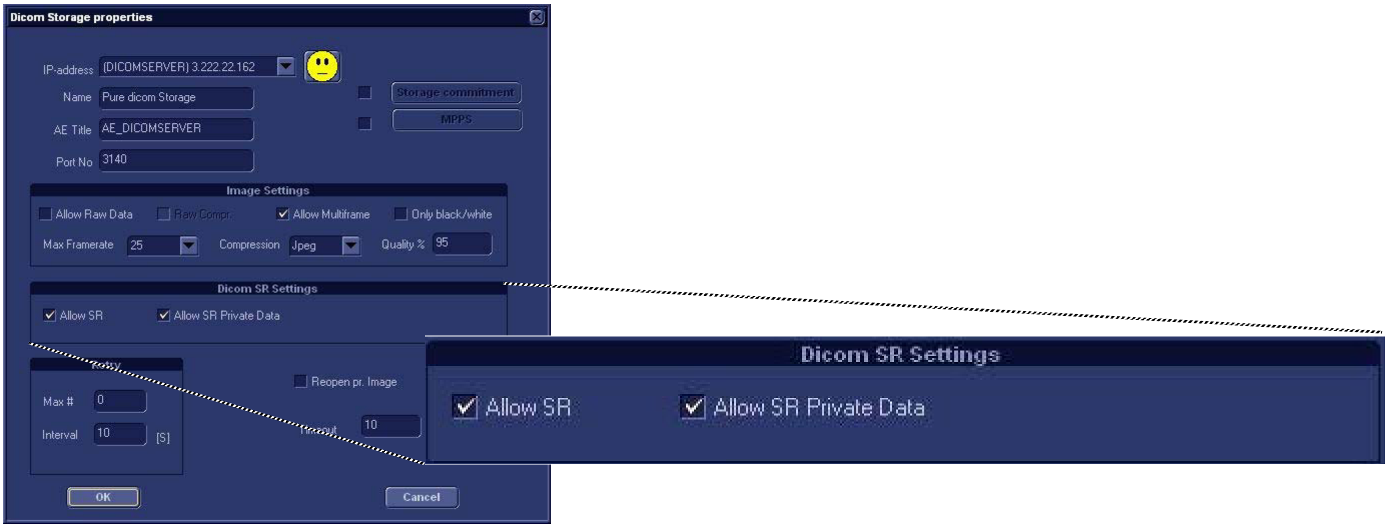
If SR is enabled, all M&A that is supported by DICOM is sent to the DICOM server (in a separate job).

Allow SR Private Data (introduced with software versions v6.0, v5.2 and v4.2.)

By default, this function is disabled.

Allow SR Private Data is intended for receivers that can handle "Private Data", like the CA-1000.

In the examples in Figure 3-67 and Figure 3-68 (below), **Allow SR Private Data** has been enabled.


Dicom Storage properties
Storage commitment
MPPS
Image Settings
Dicom SR Settings
Retry
OK
Cancel

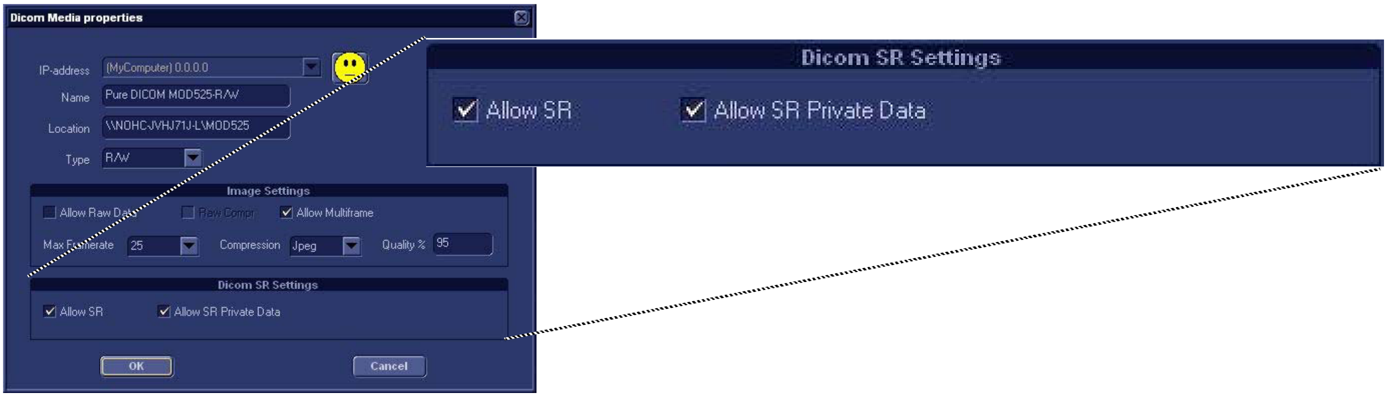
IP-address (DICOMSERVER) 3.222.22.162
Name Pure dicom Storage
AE Title AE_DICOMSERVER
Port No 3140

☐ Allow Raw Data ☐ Raw Compr. ☑ Allow Multiframe ☐ Only black/white
Max Framerate 25 Compression Jpeg Quality % 95

☑ Allow SR ☑ Allow SR Private Data

Max # 0
Interval 10 [S]
☐ Reopen pr. Image
Timeout 10

Figure 3-67 Dicom Storage properties


Dicom Media properties
Image Settings
Dicom SR Settings
OK
Cancel

IP-address (MyComputer) 0.0.0.0
Name Pure DICOM MOD525-R/W
Location \\NOHC-JVHJ71J-L\MOD525
Type R/W

☐ Allow Raw Data ☐ Raw Compr. ☑ Allow Multiframe
Max Framerate 25 Compression Jpeg Quality % 95

☑ Allow SR ☑ Allow SR Private Data

Figure 3-68 Dicom Media properties

3-9-14-6 DICOM Storage Properties Adjustments (cont'd)

Retry

- Max # - The number of times the software will try to connect if the connection doesn't succeed the first time(s).
- Interval - The interval in seconds between each attempt to connect.

Smiley

Select the Smiley button to ping the server. If the network connection is OK, the Smiley will smile, if the connection fail, the Smiley will turn sad.

NOTE: The smiley checks if the remote server is accessible (ping). It is not a DICOM Echo (DICOM ping), so it does not check AE title or port number.

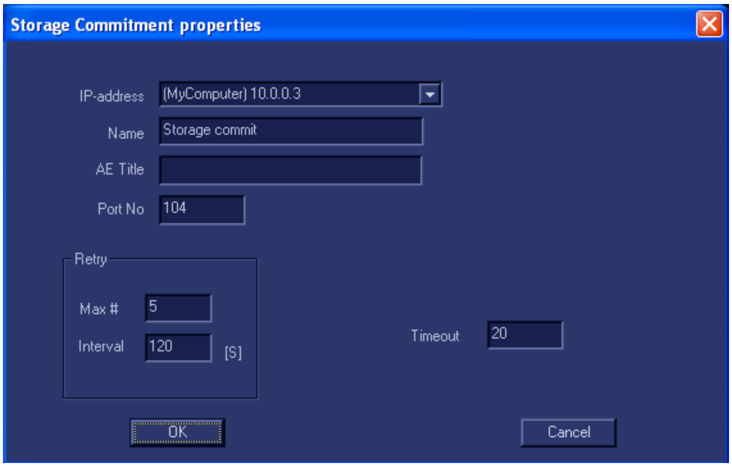
Reopen per Image

If Reopen per image is enabled, Vivid 7 will create a new connection (association) for each image. This may be useful for DICOM servers that do not accept different image types in the same association.

Storage Commitment

If you want to enable Storage Commitment, check the check-box and select the button "Storage Commitment".

In the dialog, enter IP address, Name, AE Title and Port Number.



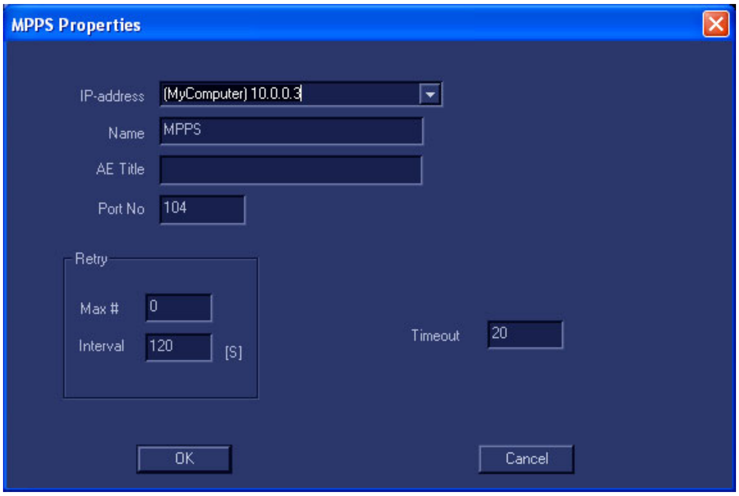
IP-address: (MyComputer) 10.0.0.3
Name: Storage commit
AE Title:
Port No: 104
Retry
Max #: 5
Interval: 120 [S]
Timeout: 20

Figure 3-69 Storage Commitment

3-9-14-6 DICOM Storage Properties Adjustments (cont'd)

MPPS

If you want to enable MPPS, check the check-box and select the button "MPPS". In the dialog, enter IP address, Name, AE Title and Port Number.



IP-address: (MyComputer) 10.0.0.3
Name: MPPS
AE Title:
Port No: 104
Max #: 0
Interval: 120 [S]
Timeout: 20

Figure 3-70 MPPS

Time-out

Adjust Time-out setting

Introduced with software versions v6.0, v5.2 and v4.2: The retry settings can be used to make jobs retry on bad networks. There is no need to set retries for mobile (off-line) use when these software versions are used.

Software v5.1.x/v4.1.x and lower: The retry settings for DICOM Storage are by default for mobile (off-line) use. They ensure that jobs in the spooler will be sent automatically if the user reconnects within the total retry period. If the customer does not have the mobile case, you can reduce the number of retries and the interval. This will make the job fail faster if there is a network or server problem (and let the user forward the job to another server if desired).

OK/Cancel

- Select **OK** to save all changes. The changes will take place after the scanner has been restarted.
- Select **Cancel** to return without saving any changes.

3-9-15 Export Configuration

The destination for Export of patient records to Excel and MPEG must be configured prior to use. This is done from the *Dataflow screen*.

3-9-15-1 Setup on the Remote Share

Required setup on the remote share (remote server):

1.) Add user and password.

Predefined user: **E1c2h3o4C5l6i7e8n9t**
Predefined password: **u1l3t5r7a**

2.) Set Share permissions.

3.) Set security permissions.

3-9-15-2 Display the Dataflow Screen

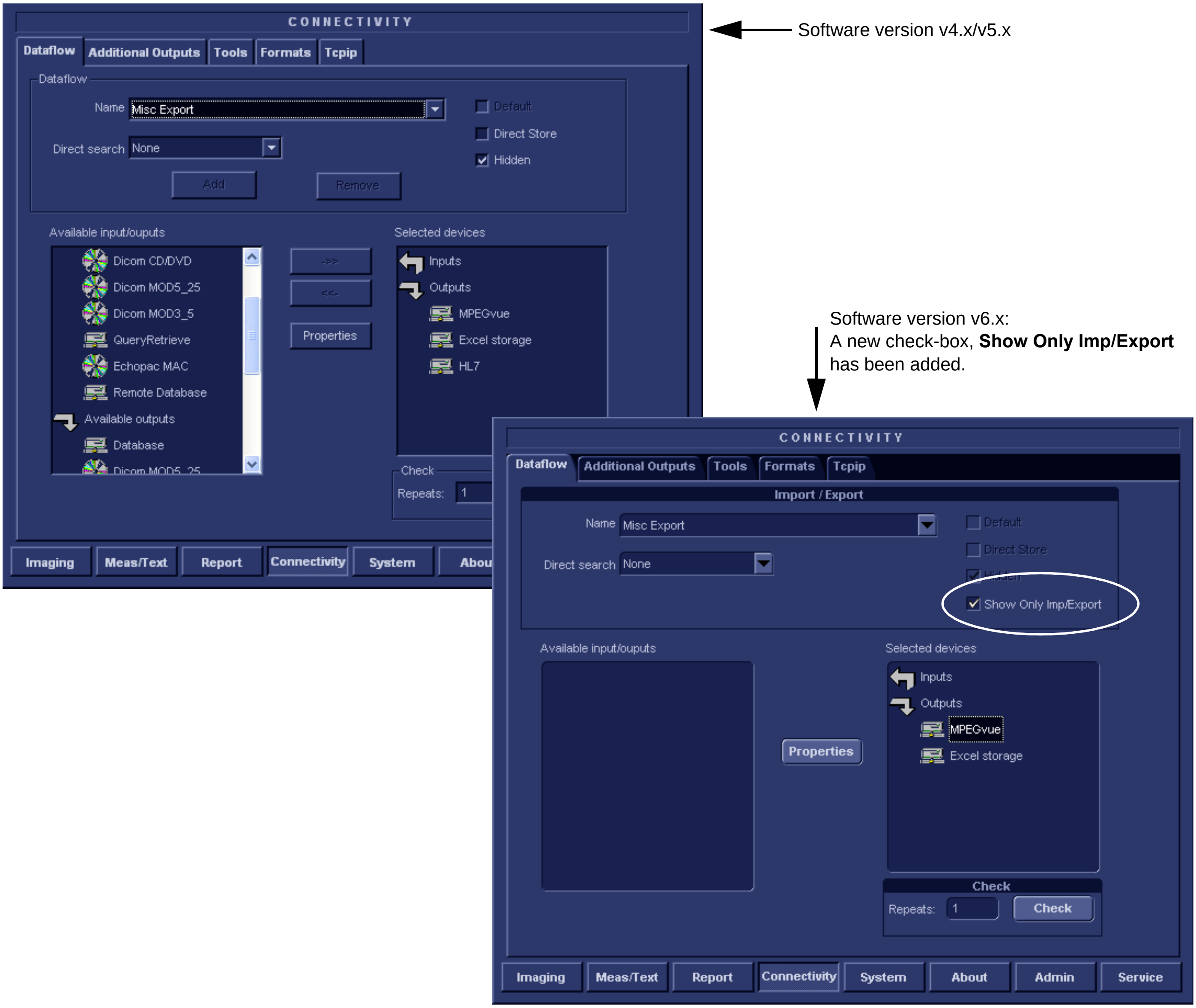
Follow these steps to display the Dataflow Screen:

1.) Press **CONFIG (F2)** and log on as administrator.

2.) Select **Connectivity** > **Dataflow**.

The *Dataflow sheet* is displayed, see Figure 3-71 "The Dataflow sheet" on page 3-71.

3.) Select the dataflow **Misc. Export** in the **Name** pull-down menu.



Software version v4.x/v5.x

CONNECTIVITY

Dataflow

Name: Misc Export

Direct search: None

☐ Default
☐ Direct Store
☑ Hidden

Available input/ouputs: Dicom CD/DVD, Dicom MOD5_25, Dicom MOD3_5, QueryRetrieve, Echopac MAC, Remote Database, Available outputs, Database, Dicom MOD5_25

Selected devices: Inputs; Outputs: MPEGvue, Excel storage, HL7

Check — Repeats: 1

Software version v6.x:
A new check-box, **Show Only Imp/Export** has been added.

CONNECTIVITY

Import / Export

Name: Misc Export

Direct search: None

☐ Default
☐ Direct Store
☑ Hidden
☑ Show Only Imp/Export

Available input/ouputs

Selected devices: Inputs; Outputs: MPEGvue, Excel storage

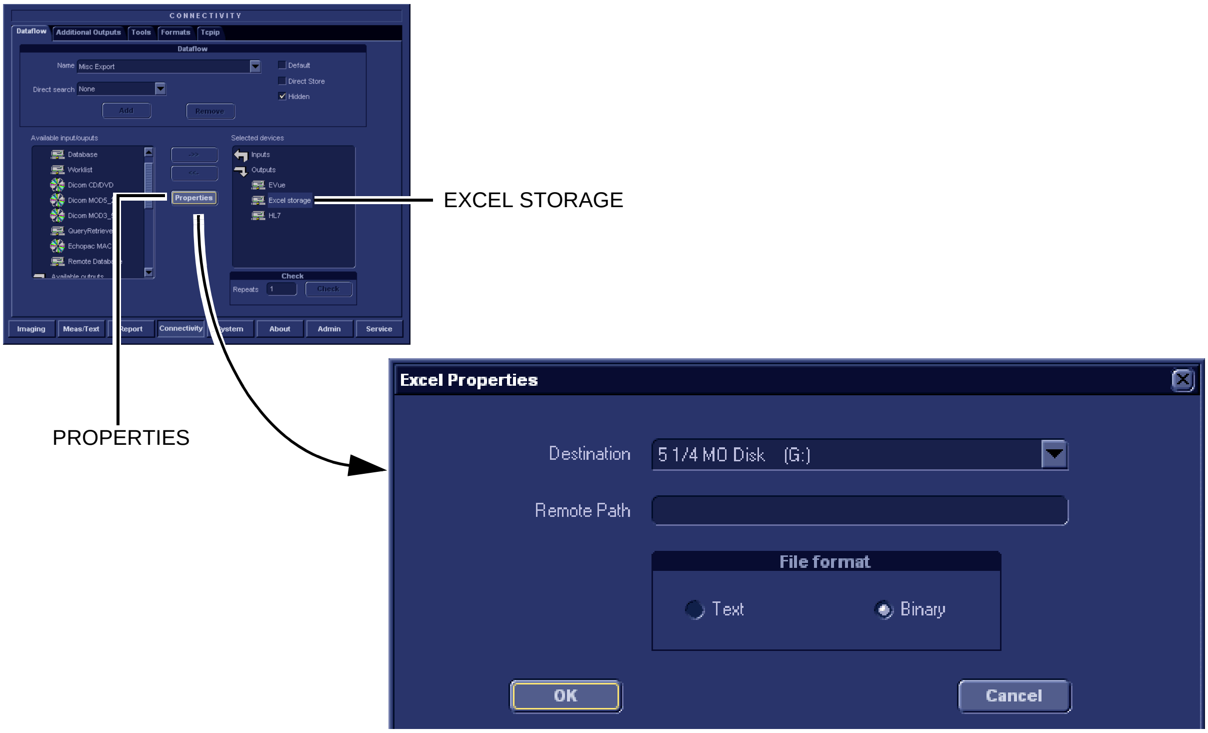
Check — Repeats: 1

Dataflow
Additional Outputs
Tools
Formats
Tcpip
Add
Remove
->>
<<-
Properties
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service
Check

Figure 3-71 The Dataflow sheet

3-9-15-3 Export to Excel Configuration

1.) Select the **Excel storage** device in the *Selected devices pane* and press **Properties**.
The *Excel properties window* is displayed.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Name
Misc Export
Direct search
None
Default
Direct Store
Hidden
Add
Remove
Available input/outputs
Database
Worklist
Dicom CD/DVD
Selected devices
Inputs
Outputs
EVue
Excel storage
HL7
Properties
Check
Repeats
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service
EXCEL STORAGE
PROPERTIES
OK
Cancel

Excel Properties

Destination: 5 1/4 MO Disk (G:)

Remote Path:

File format: ○ Text ● Binary

Figure 3-72 The Excel properties window

2.) Select a removable media or a network volume remote path as the destination in the Destination pull-down menu.

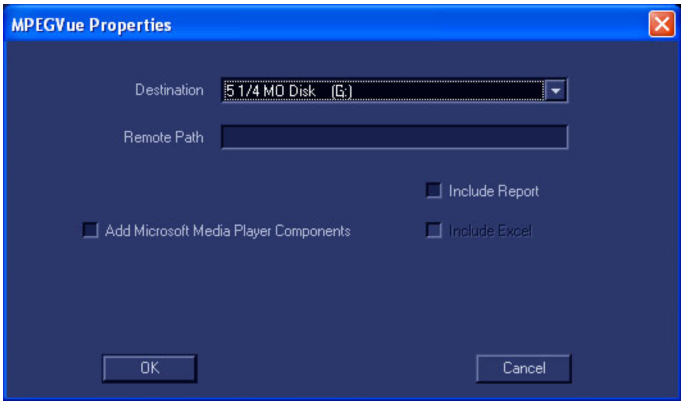
NOTE: Remote paths for network volumes must be entered once in the Remote path field before they can be selected from the Destination Pull-down menu.

3.) Select **OK.**

4.) Press **CONFIG** (**F2**) if you want to quit Config.

3-9-15-4 Export to MPEGVue Configuration

1.) Select the **MPEGVue** device in the *Selected devices* pane and press **Properties**.
The *MPEGVue properties window* is displayed.



Destination: 5 1/4 MO Disk (G:)

Remote Path:

☐ Include Report

☐ Add Microsoft Media Player Components

☐ Include Excel

Figure 3-73 The MPEGVue properties window

2.) Select a removable media or a network volume remote path as the destination in the *Destination Pull-down menu*.

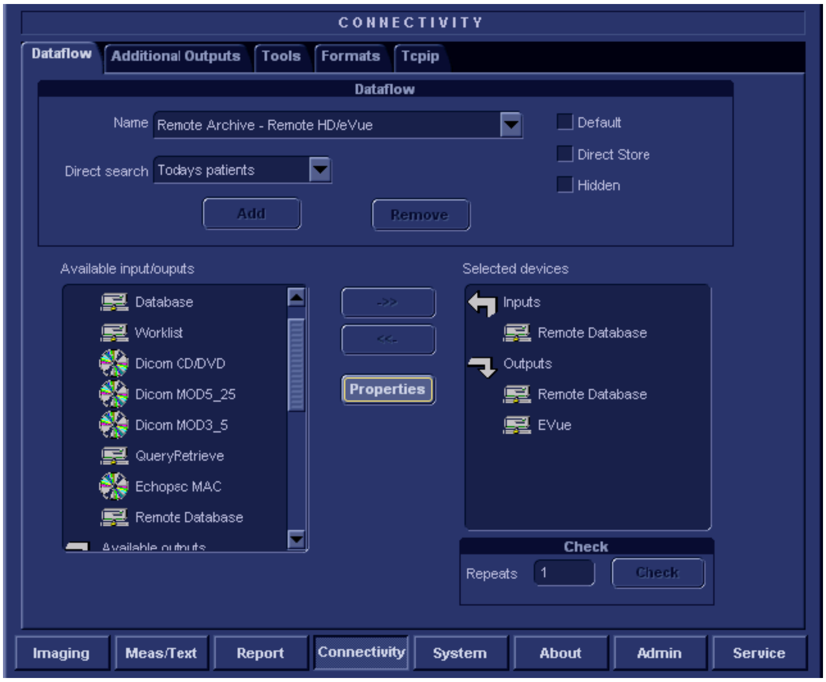
NOTE: Remote paths of network volumes must be entered once in the Remote path field before they can be selected from the Destination Pull-down menu.

3.) Check the options as required.
4.) Select OK.
5.) Press CONFIG (F2) if you want to exit Configuration.

3-9-15-5 eVue Configuration

1.) Press **CONFIG (F2)** and log on as administrator.

2.) Select the **Connectivity** category and **Dataflow** subgroup. The Dataflow sheet is displayed.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available input/ouputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
Available outputs
->>
<<-
Properties
Check
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Name: Remote Archive - Remote HD/eVue
Direct search: Todays patients
☐ Default
☐ Direct Store
☐ Hidden

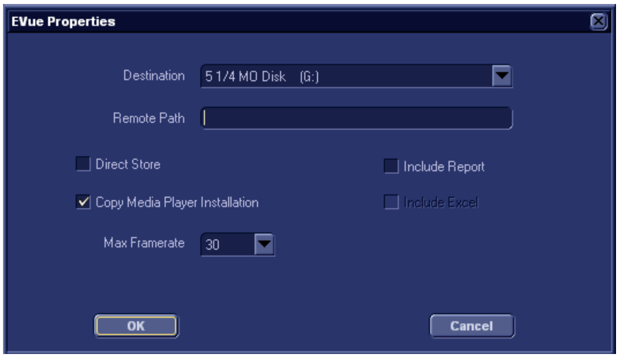
Selected devices
- Inputs
  - Remote Database
- Outputs
  - Remote Database
  - EVue

Repeats: 1

Figure 3-74 The eVue dataflow

3.) Select the dataflow **Local Archive - Int. HD/eVue** in the Name pull-down menu.

4.) Select the **eVue** device in the **Selected devices** pane and press **Properties**. The **eVue properties** window is displayed.


EVue Properties
OK
Cancel

Destination: 5 1/4 MO Disk (G:)
Remote Path:
☐ Direct Store
☐ Include Report
☑ Copy Media Player Installation
☐ Include Excel
Max Framerate: 30

Figure 3-75 The eVue Properties

5.) Select a removable media or a network volume remote path as the destination in the **Destination** pull-down menu.

NOTE: Remote paths of network volumes must be entered once in the Remote path field before they can be selected from the Destination Pull-down menu.

6.) Check the options as required.

7.) Select **OK** and press **CONFIG (F2)**.

3-9-16 Create a New Dataflow

3-9-16-1 Overview

It is possible to make new dataflows by combining the predefined settings. The table below describes the legal combination of inputs and outputs in a dataflow.

Output → Input ↓	No Output	Database	Remote Database	DICOM MOD 5.25	DICOM MOD 3.5	DICOM Storage	DICOM Print	Database + DICOM MOD 5.25/3.5	Database + DICOM Storage	Remote Database + DICOM MOD 5.25/3.5	Remote Database + DICOM Storage
Database		X						X	X		
Remote Database			X							X	X
DICOM Worklist						X					
DICOM CD	X										
DICOM MOD 5.25				X							
DICOM MOD 3.5					X						
Query/Retrieve	X										
EchoPAC Mac	X										
Worklist/database		X							X		
Worklist/rem database			X								X
No input device						X	X				

Table 3-16 Allowed combinations of inputs and outputs in a dataflow

3-9-16-2 Create a New Dataflow with Worklist, Database and DICOM Storage

(Introduced for software v4.0)

To create a new dataflow with Worklist, Database and DICOM Storage, do the following in exactly these steps:

NOTICE Failure to add destinations to the dataflow in the correct order may or will cause intermittent errors.

1.) Add the Worklist Input, highlight it, select properties, and name it (i.e.: DR PACS Worklist or just Worklist).

Go to the IP Address field, scroll down and select <Modify>. This will allow you to edit or add IP Addresses (New Destinations/devices). If the correct IP Address is already in the list, just select it.

2.) Add the Database Input/Output, highlight it, select properties, and name it (i.e.: Local Archive - Int HD).

Go to the IP Address field and (if the Database is to be the Local Archive) verify that "My Computer" is selected.

The IP Address should then be correct and the Database Name and Archive File Location entries should auto-populate correctly.

3-9-16-2 Create a New Dataflow with Worklist, Database and DICOM Storage (cont'd)

3.) Add the DICOM Storage Output, highlight it, select properties, and name it (i.e.: DR PACS Store).

Go to the IP Address field, scroll down and select <Modify>. This will allow you to edit or add IP Addresses (New Destinations/devices).

If the correct IP Address is already in the list, just select it.

If you create the Dataflow in any other order or remove and add an entry later, you may or will receive "you are not connected to the Database" errors when trying to create a patient locally. The Worklist will work, however they can NOT save patients "created" on the Vivid 7 to the Archive while using that dataflow.

You can change the information on each entry in a Dataflow as long as you do NOT remove or add to the Dataflow out of sequence.

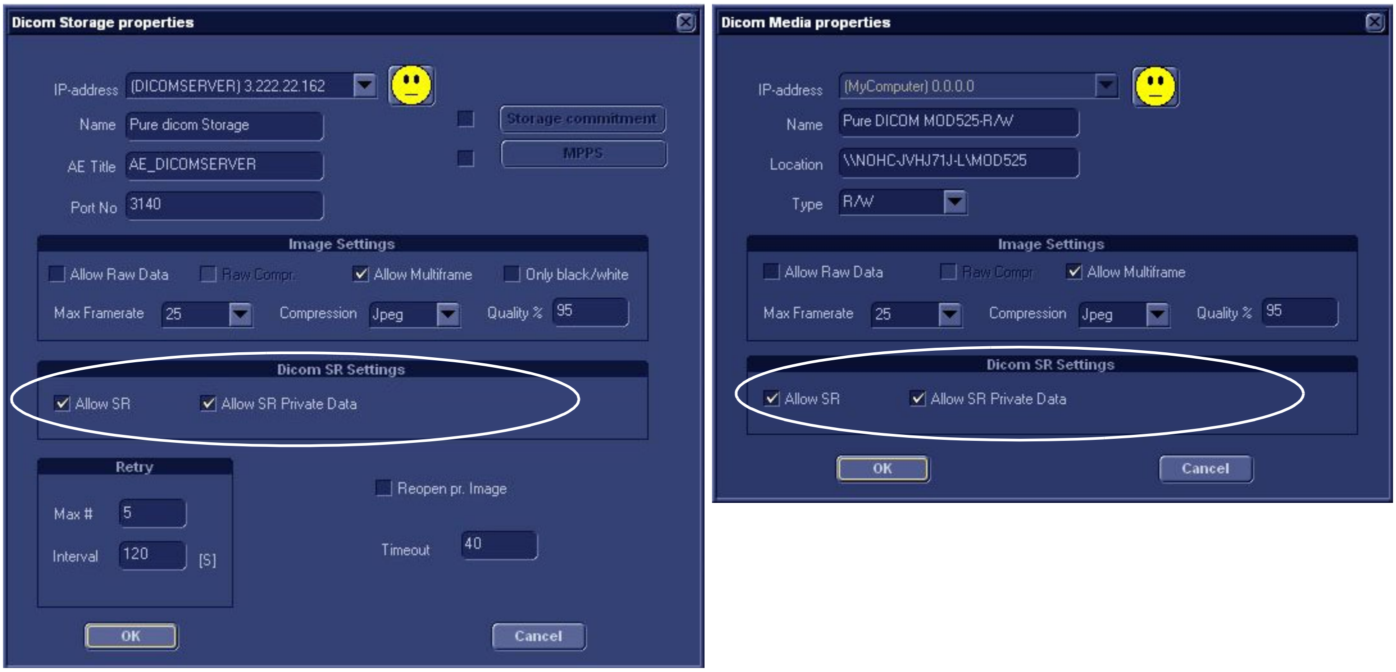
You should also set Direct Search to "All patients" for the new dataflow.

3-9-16-3 Create a New Dataflow with Worklist and DICOM Storage (for CA-1000 sites)

This dataflow is intended for Vivid 7 scanners in a DICOM network, where the data should not be stored locally on the scanner. A site with the integrated EchoPAC PC and CA-1000 is an example of this.

To create a new dataflow with Worklist and DICOM Storage, do the following steps:

1.) Add a new dataflow in Config screen, Connectivity, Dataflow tab. Enter a name, e.g. **Worklist - DICOM Storage**.
2.) Select **OK**.
3.) Add the Worklist input. Configure (at least) **IP address**, **AE title** and **Port Number**.
4.) Select **OK**.
5.) Add the Dicom Storage output.
6.) Configure (at least) **IP address**, **AE title** and **Port Number**. If the site has integrated EchoPAC PC and CA-1000, enable **Allow SR** and **Allow SR Private Data**.


Dicom Storage properties

IP-address (DICOMSERVER) 3.222.22.162
Name Pure dicom Storage
AE Title AE_DICOMSERVER
Port No 3140
☐ Storage commitment
☐ MPPS

Image Settings

☐ Allow Raw Data ☐ Raw Compr. ☑ Allow Multiframe ☐ Only black/white
Max Framerate 25 Compression Jpeg Quality % 95

Dicom SR Settings

☑ Allow SR ☑ Allow SR Private Data

Retry

Max # 5
Interval 120 [S]
☐ Reopen pr. Image
Timeout 40

Dicom Media properties

IP-address (MyComputer) 0.0.0.0
Name Pure DICOM MOD525-R/W
Location \\NOHC-JVHJ71J-L\MOD525
Type R/W

Image Settings

☐ Allow Raw Data ☐ Raw Compr ☑ Allow Multiframe
Max Framerate 25 Compression Jpeg Quality % 95

Dicom SR Settings

☑ Allow SR ☑ Allow SR Private Data

Figure 3-76 Dicom SR Settings

7.) Select **OK**.
8.) If this dataflow should be the default at start-up, enable **Default** for the dataflow.

3-9-17 Query/Retrieve (Q/R) Setup for Software v7.x/v6.x/v5.x/v4.x

3-9-17-1 Overview

The Query/Retrieve function makes it possible to search for and retrieve DICOM data from a DICOM server for further analysis on the Vivid 7.

NOTE: You may have to set up Vivid 7 as a destination on the server.

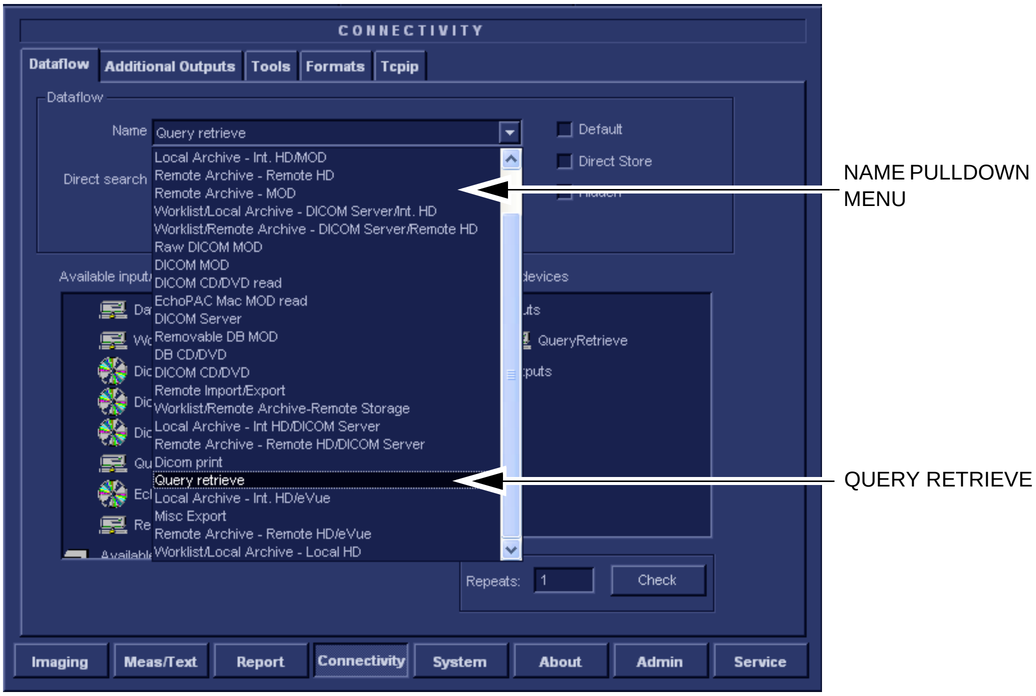
3-9-17-2 Query/Retrieve Setup on the Vivid 7 with Software v7.x/v6.x/v5.x/v4.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select Connectivity

3.) Select Dataflow

4.) Select Query Retrieve from the Name pull down menu


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Default
Direct Store
Direct search
Available input
devices
QueryRetrieve
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote HD
Raw DICOM MOD
DICOM MOD
DICOM CD/DVD read
EchoPAC Mac MOD read
DICOM Server
Removable DB MOD
DB CD/DVD
DICOM CD/DVD
Remote Import/Export
Worklist/Remote Archive-Remote Storage
Local Archive - Int HD/DICOM Server
Remote Archive - Remote HD/DICOM Server
Dicom print
Query retrieve
Local Archive - Int. HD/eVue
Misc Export
Remote Archive - Remote HD/eVue
Worklist/Local Archive - Local HD
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Name: Query retrieve

Repeats: 1

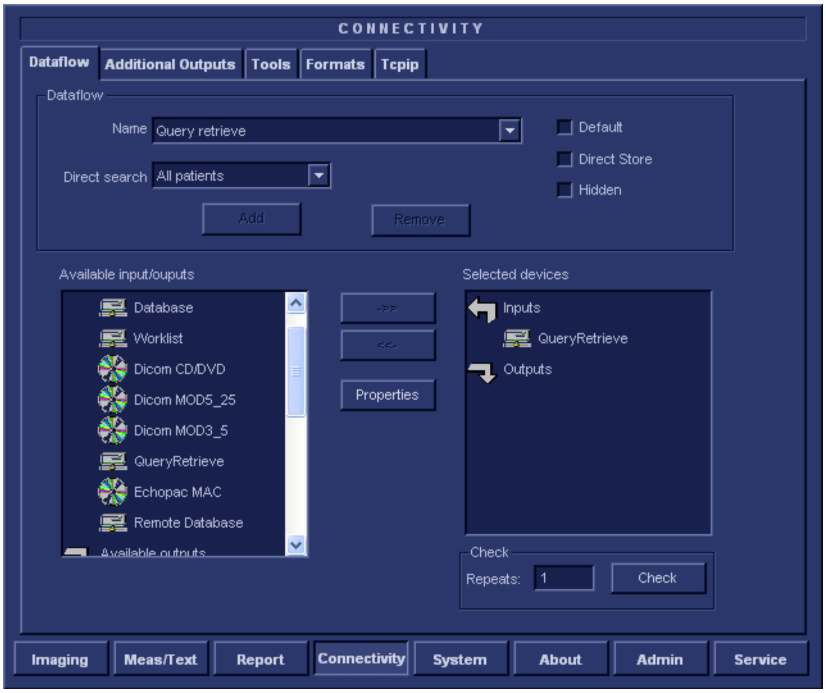
NAME PULLDOWN MENU

QUERY RETRIEVE

Figure 3-77 Select Query Retrieve

3-9-17-2 Query/Retrieve Setup on the Vivid 7 with Software v7.x/v6.x/v5.x/v4.x (cont'd)

In Figure 3-78, the selected dataflow, Query/Retrieve, is shown.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available input/ouputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
Available outputs
->>
<<-
Properties
Selected devices
Inputs
QueryRetrieve
Outputs
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Name: Query retrieve

Direct search: All patients

☐ Default

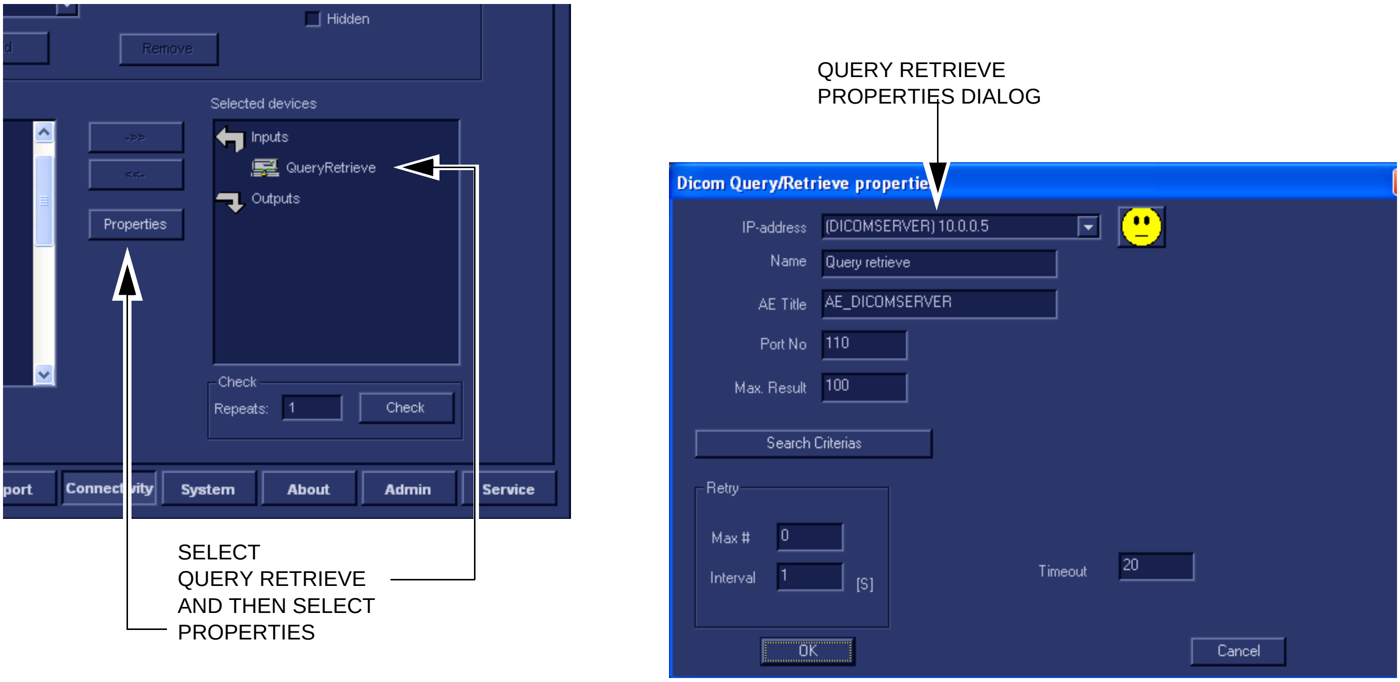
☐ Direct Store

☐ Hidden

Repeats: 1

Figure 3-78 Query/Retrieve workflow

5.) Select QueryRetrieve so it is highlighted and then select Properties to display the Properties dialog.


Hidden
Remove
Selected devices
->>
<<-
Inputs
QueryRetrieve
Outputs
Properties
Check
Repeats:
1
Check
port
Connectivity
System
About
Admin
Service
Dicom Query/Retrieve properties
Search Criterias
Retry
OK
Cancel

QUERY RETRIEVE PROPERTIES DIALOG

SELECT QUERY RETRIEVE AND THEN SELECT PROPERTIES

IP-address: (DICOMSERVER) 10.0.0.5

Name: Query retrieve

AE Title: AE_DICOMSERVER

Port No: 110

Max. Result: 100

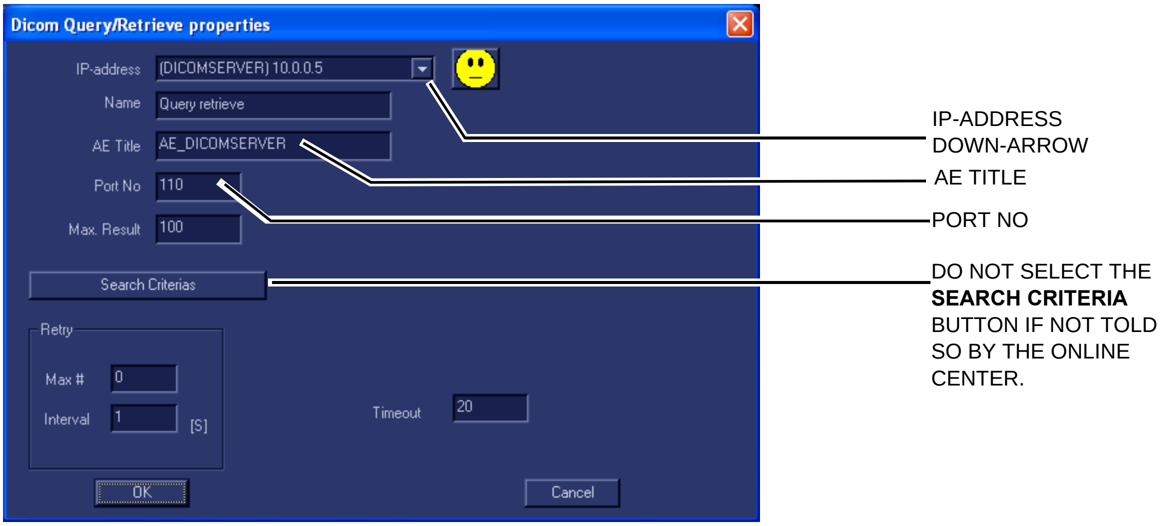
Max #: 0

Interval: 1 [S]

Timeout: 20

Figure 3-79 Select Query/Retrieve's Properties

3-9-17-2 Query/Retrieve Setup on the Vivid 7 with Software v7.x/v6.x/v5.x/v4.x (cont'd)



Dicom Query/Retrieve properties

IP-address (DICOMSERVER) 10.0.0.5

Name Query retrieve

AE Title AE_DICOMSERVER

Port No 110

Max. Result 100

Retry

Max # 0

Interval 1 [S]

Timeout 20

IP-ADDRESS DOWN-ARROW

AE TITLE

PORT NO

DO NOT SELECT THE **SEARCH CRITERIA** BUTTON IF NOT TOLD SO BY THE ONLINE CENTER.

Figure 3-80 DICOM Query/Retrieve properties

6.) Select the IP-address down-arrow to choose the DICOM Query/Retrieve server from the pull down menu. In some cases, the server to use is the same as used for DICOM Storage.

If the server to use is missing from the list, select <Modify> from the pull down menu and edit the setup for one of the predefined servers.

7.) Enter the correct AE Title and Port Number for the DICOM Query/Retrieve server in the respective fields in the Query/Retrieve screen.

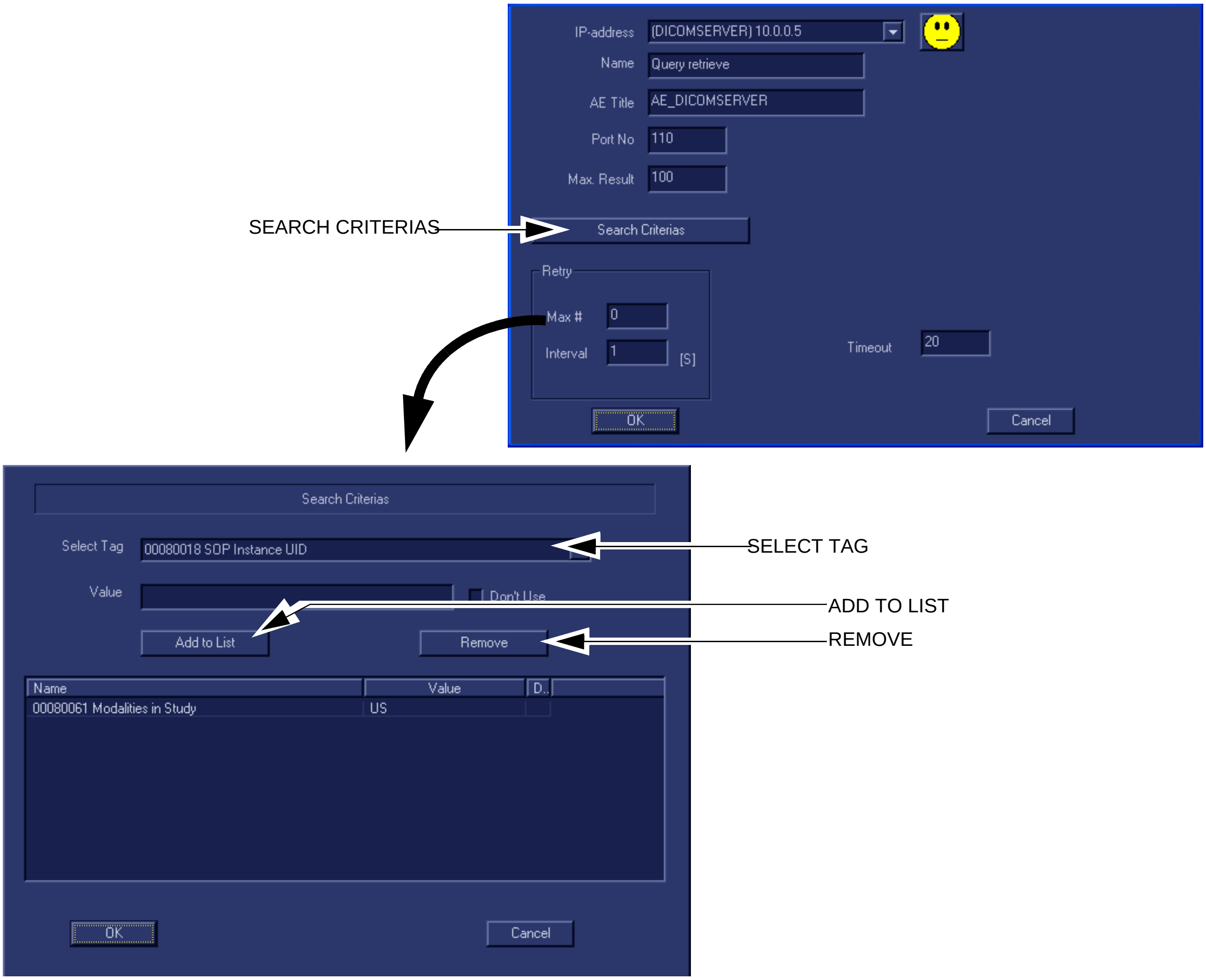
3-9-17-2 Query/Retrieve Setup on the Vivid 7 with Software v7.x/v6.x/v5.x/v4.x (cont'd)

Change Search Criterias

It is possible to set up special Search Criterias for DICOM Query/Retrieve. In most cases you may leave the Search Criterias as is, and skip this adjustment.

Follow the steps below to change the Search Criterias parameters:

1.) Select Search Criterias


SEARCH CRITERIAS
Search Criterias
OK
Cancel
Search Criterias
SELECT TAG
ADD TO LIST
REMOVE
Add to List
Remove
OK
Cancel

IP-address [DICOMSERVER] 10.0.0.5
Name Query retrieve
AE Title AE_DICOMSERVER
Port No 110
Max. Result 100
Retry
Max # 0
Interval 1 [S]
Timeout 20

Select Tag 00080018 SOP Instance UID
Value
☐ Don't Use

Name	Value	D..
00080061 Modalities in Study	US	

Figure 3-81 Select Search Criterias

2.) Select the correct tag from the Select Tag pull-down menu.

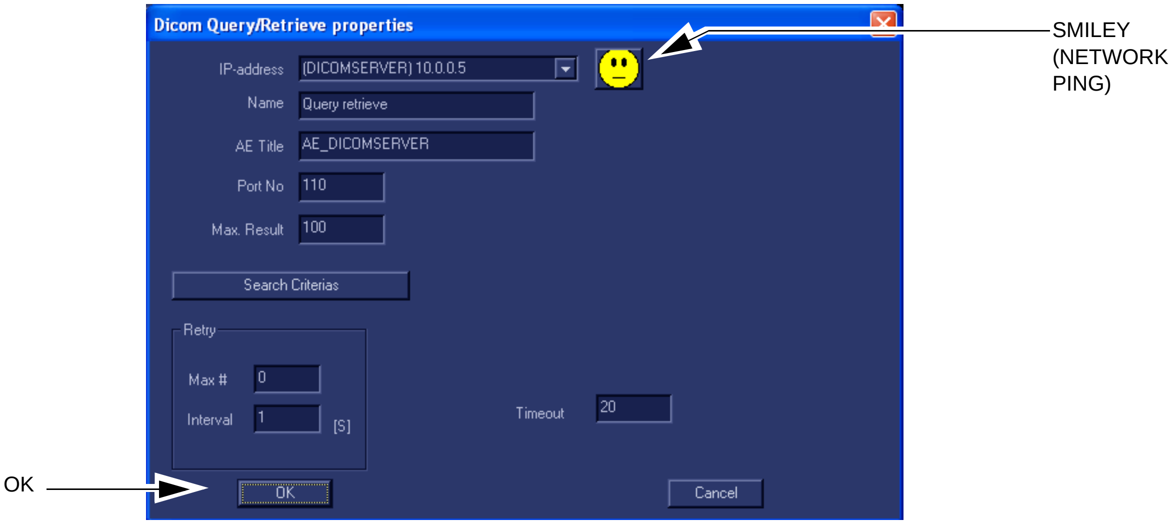
3.) If needed, type in the value.

NOTE: *In this example, tag 00080060 Modality has been added to the list with value "US". This may be useful if the studies contain non-ultrasound images.*

4.) Select Add to List

5.) Select OK to close the Search Criterias window.

3-9-17-3 Query/Retrieve Verification



IP-address (DICOMSERVER) 10.0.0.5
Name Query retrieve
AE Title AE_DICOMSERVER
Port No 110
Max. Result 100
Max # 0
Interval 1 [S]
Timeout 20

Figure 3-82 DICOM Query/Retrieve properties

Follow the Steps Below to do a First Test (TCP-IP Ping) of the Connection

1.) Select **Query retrieve** and then select **Properties**.

2.) Select the “Smiley” button to Ping the server.

NOTE: *The smiley checks if the remote server is accessible (ping). It is not a DICOM Echo (DICOM ping), so it does not check AE title or port number.*

3.) If the network connection to the server is OK, it will be illustrated by an smiling “Smiley” ☺.
A sad Smiley indicates that the network connection is failing.
Typical causes:
- Network cable not connected.
- Configuration error(s).

4.) When ready, select OK to close the DICOM Query/Retrieve properties and save changes.

3-9-17-3 Query/Retrieve Verification (cont'd)

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow

NOTE: This check uses both Ping and DICOM Ping.
- Ping is used to verify the TCP/IP connection to the server.
- DICOM Ping is used to verify that the DICOM application is answering.

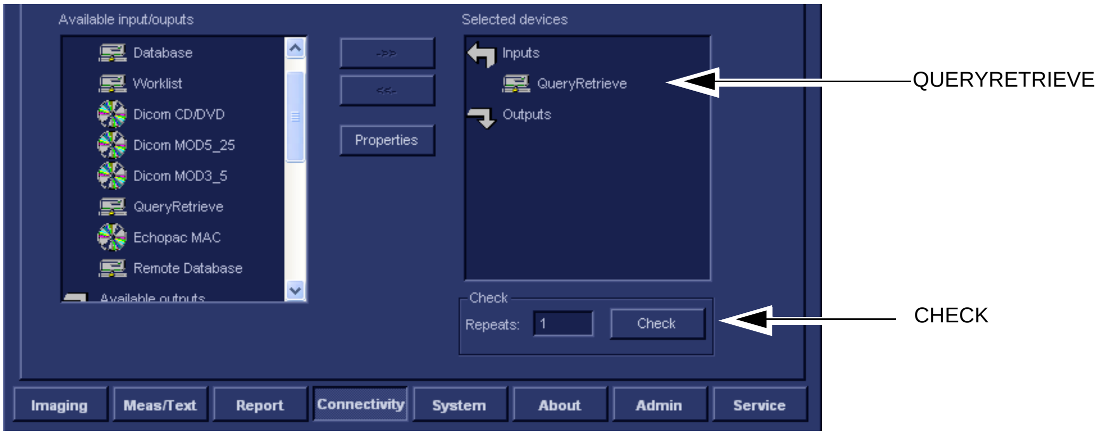
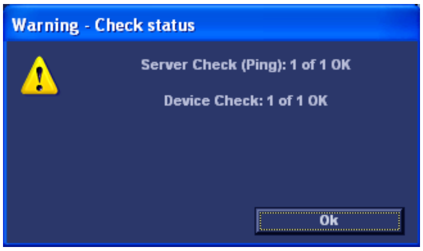

Available input/ouputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
Available outputs
->>
<<-
Properties
Selected devices
Inputs
QueryRetrieve
Outputs
Check
Repeats:
1
Check
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service
QUERYRETRIEVE
CHECK

Figure 3-83 Check the DICOM Query/Retrieve workflow

1.) Select QueryRetrieve from the Selected devices list.

2.) Select Check.

- If the test pass, a pop-up dialog, reporting the results as OK, is displayed, see Figure 3-84.


Warning - Check status
Ok

Server Check (Ping): 1 of 1 OK

Device Check: 1 of 1 OK

Figure 3-84 Test (Check) Passed

- Select OK to continue.
  A green check mark to the left of the Selected devices indicates that the test was successfully passed.

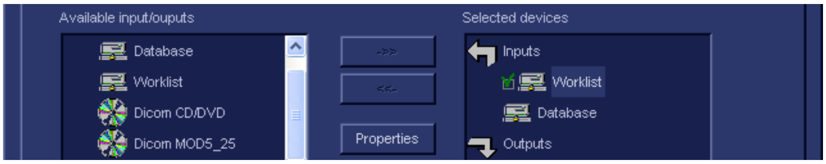
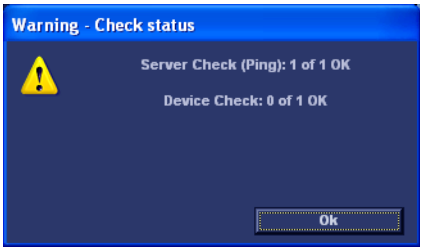

Available input/ouputs
Database
Worklist
Dicom CD/DVD
Dicom MOD5_25
->>
<<-
Properties
Selected devices
Inputs
Worklist
Database
Outputs

Figure 3-85 Test (Check) Passed

3-9-17-3 Query/Retrieve Verification (cont'd)

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow (cont'd)

- If the test fails, a pop-up dialog reporting the results as "0 of 1 OK" is displayed. In the example in Figure 3-86, the warning message pop up almost at once, and it states that for the Server Check (Ping), 1 of 1 is OK but the Device Check failed (0 of 1 OK). This indicates that the network connection functions OK, but the application on the remote server is not answering. If the test fails directly, as described in this example, the AE Title is probably wrong.



Warning - Check status

Server Check (Ping): 1 of 1 OK

Device Check: 0 of 1 OK

Figure 3-86 Test (Check) Fails directly

A red "X" to the left of the Selected devices indicates that the test failed, but it doesn't indicate the cause.

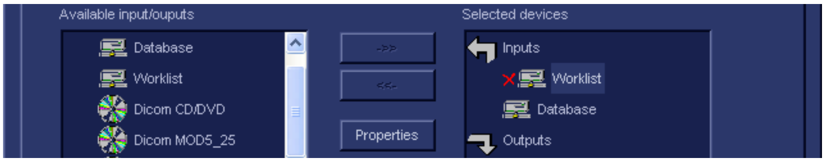
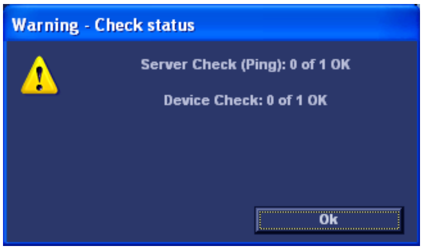


Figure 3-87 Test (Check) Passed

- If the Check button fails after a long time (corresponding to the timeout), the Warning will look like the example in Figure 3-88, where both tests failed.



Warning - Check status

Server Check (Ping): 0 of 1 OK

Device Check: 0 of 1 OK

Figure 3-88 Both Tests Failed

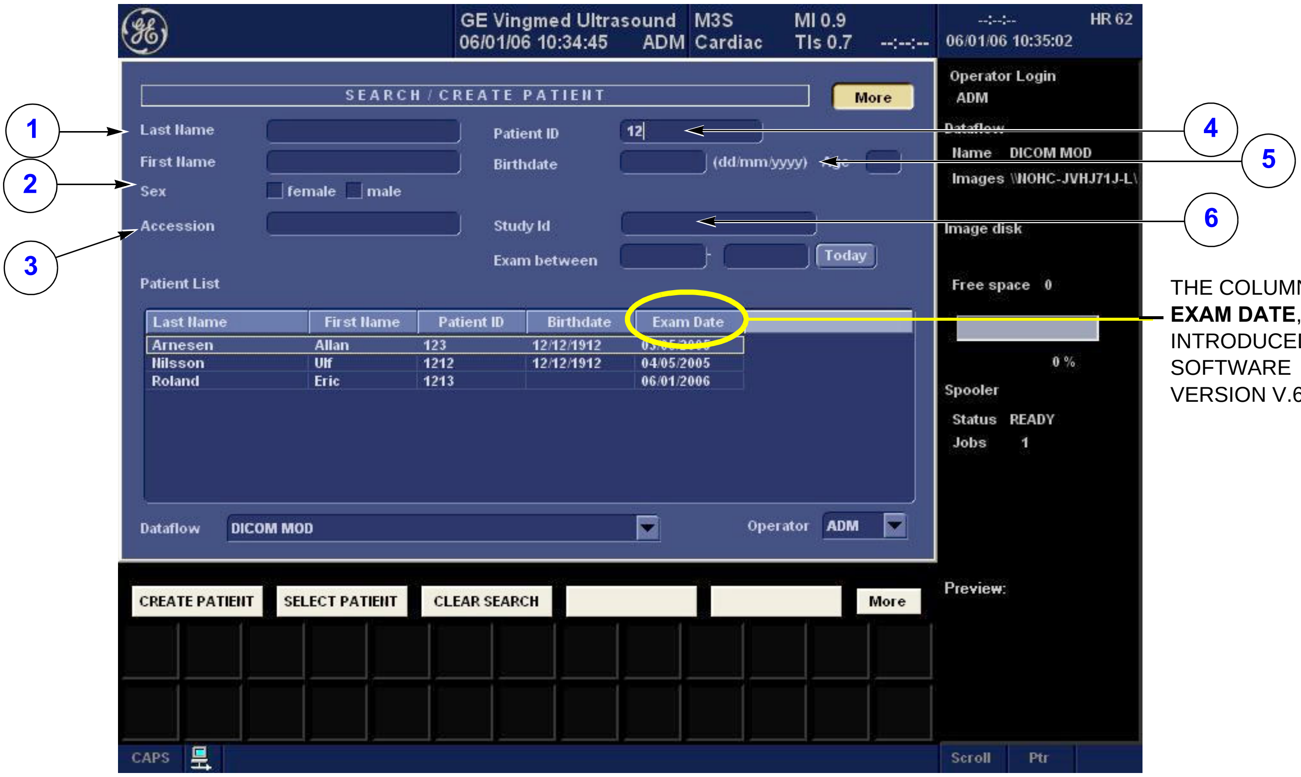
In this case, the IP address or Port Number is probably wrong.

If Retrieve is Failing ...

If Retrieve is failing but Query is functioning, verify if the scanner has been registered as an receiver on the server.

3-9-18 Mapping of Parameters from Vivid 7 to DICOM

3-9-18-1 Search Screen


GE Vingmed Ultrasound
06/01/06 10:34:45
M3S
ADM
Cardiac
MI 0.9
TIs 0.7
--:--:--
--:--:--
HR 62
06/01/06 10:35:02
SEARCH / CREATE PATIENT
More
Last Name
First Name
Sex
☐ female
☐ male
Accession
Patient ID
Birthdate
(dd/mm/yyyy)
Study Id
Exam between
Today
Patient List
Dataflow
Operator
CREATE PATIENT
SELECT PATIENT
CLEAR SEARCH
More
CAPS
Scroll
Ptr
1
2
3
4
5
6

Patient ID: 12

Last Name	First Name	Patient ID	Birthdate	Exam Date
Arnesen	Allan	123	12/12/1912	03/05/2005
Nilsson	Ulf	1212	12/12/1912	04/05/2005
Roland	Eric	1213		06/01/2006

Dataflow: DICOM MOD

Operator: ADM

Operator Login
ADM

Dataflow
Name DICOM MOD
Images \\NOHC-JVHJ71J-L\

Image disk
Free space 0
0 %

Spooler
Status READY
Jobs 1

Preview:

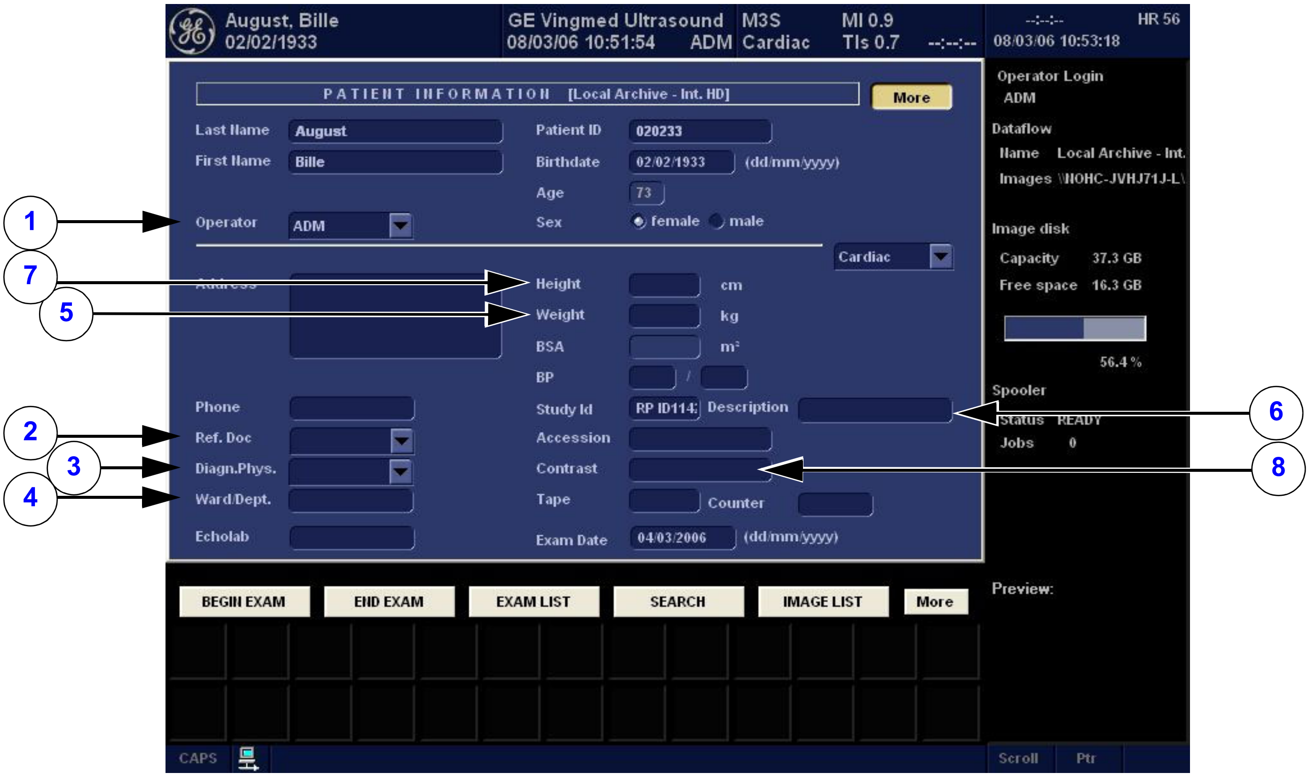
THE COLUMN **EXAM DATE**, WAS INTRODUCED FOR SOFTWARE VERSION V.6.0.

Figure 3-89 Search / Create Patient Screen

Table 3-17 Search / Create Patient Screen

ITEM	VIVID 7 FIELD NAME	DICOM TAG NUMBER	DICOM TAG NAME
1	LAST NAME, FIRST NAME	(0010,0010)	PATIENT’S NAME
2	SEX	(0010,0040)	PATIENT’S SEX
3	ACCESSION	(0008,0050)	ACCESSSION NUMBER
4	PATIENT ID	(0010,0020)	PATIENT ID
5	BIRTHDATE	(0010,0030)	PATIENT’s BIRTHDATE
6	STUDY ID	(0020,0010)	STUDY ID

3-9-18-2 Patient Information Screen


August, Bille
02/02/1933
GE Vingmed Ultrasound
08/03/06 10:51:54 ADM
M3S Cardiac
MI 0.9 TIs 0.7
--:--:--
HR 56
08/03/06 10:53:18

PATIENT INFORMATION [Local Archive - Int. HD]

Last Name: August
First Name: Bille
Operator: ADM
Patient ID: 020233
Birthdate: 02/02/1933 (dd/mm/yyyy)
Age: 73
Sex: ● female ○ male
Cardiac
Study Id: RP ID114;
Exam Date: 04/03/2006 (dd/mm/yyyy)

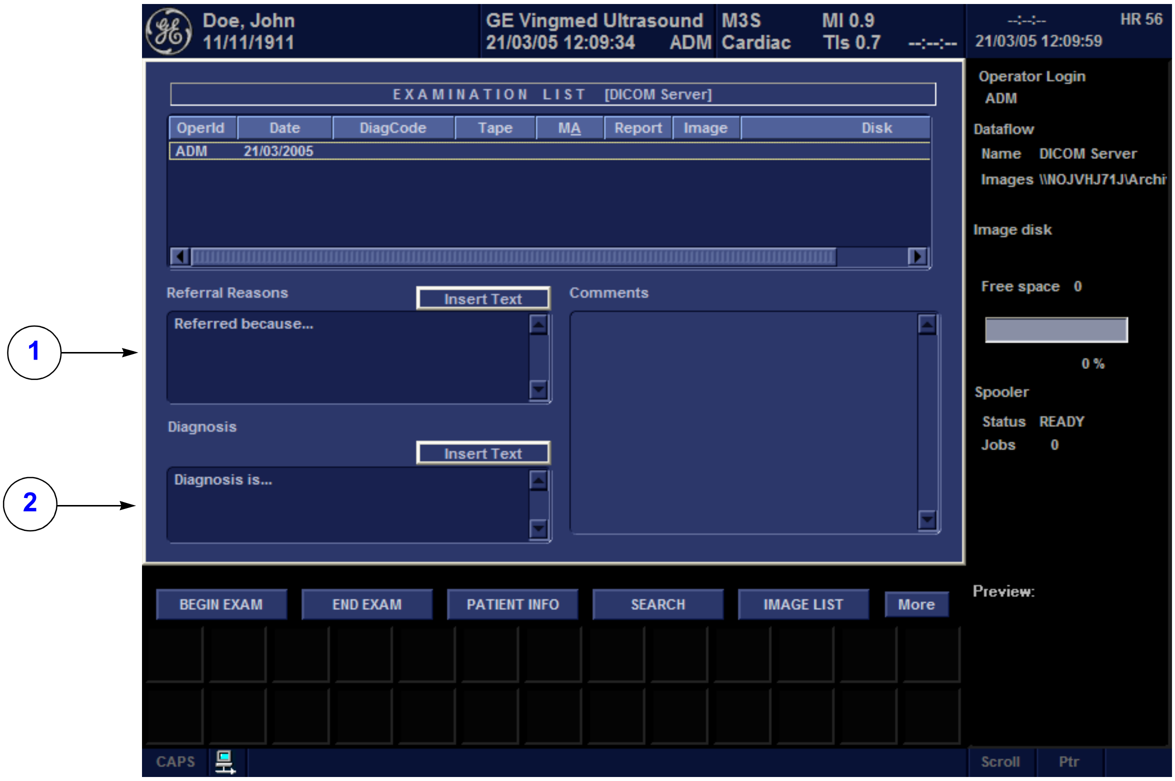
Operator Login: ADM
Dataflow
Name: Local Archive - Int.
Images: \\NOHC-JVHJ71J-L\
Image disk
Capacity: 37.3 GB
Free space: 16.3 GB
56.4 %
Spooler
Status: READY
Jobs: 0
More
Address
Height
cm
Weight
kg
BSA
m²
BP
/
Phone
Description
Ref. Doc
Accession
Diagn.Phys.
Contrast
Ward/Dept.
Tape
Counter
Echolab
BEGIN EXAM
END EXAM
EXAM LIST
SEARCH
IMAGE LIST
More
Preview:
CAPS
Scroll
Ptr
1
7
5
2
3
4
6
8

Figure 3-90 Patient Information Screen

Table 3-18 Patient Information Screen

ITEM	VIVID 7 FIELD NAME	DICOM TAG NUMBER	DICOM TAG NAME
1	OPERATOR	(0008,1070)	OPERATOR'S NAME
2	REF. DOC	(0008,0090)	REFFERING PHYSICIAN'S NAME
3	DIAGN.PHYS.	(0008,1050)	PERFORMING PHYSICIAN'S NAME
4	WARD/DEPT	(0008,1040)	INSTITUTIONAL DEPARTMENT NAME
5	WEIGHT	(0010,1030)	PATIENT'S WEIGHT
6	DESCRIPTION	(0008, 1030)	STUDY DESCRIPTION
7	HEIGHT	(0010,1020)	PATIENT'S SIZE
8	CONTRAST	(0018,0010)	CONTRAST/BOLUS AGENT

3-9-18-3 Examination List Screen



Doe, John
11/11/1911
GE Vingmed Ultrasound 21/03/05 12:09:34 ADM
M3S Cardiac
MI 0.9 TIs 0.7
HR 56 21/03/05 12:09:59

EXAMINATION LIST [DICOM Server]

OperId	Date	DiagCode	Tape	MA	Report	Image	Disk
ADM	21/03/2005						

Referral Reasons: Referred because...

Diagnosis: Diagnosis is...

Operator Login: ADM

Dataflow
Name DICOM Server
Images \\NOJVHJ71J\Archi

Image disk
Free space 0
0 %

Spooler
Status READY
Jobs 0

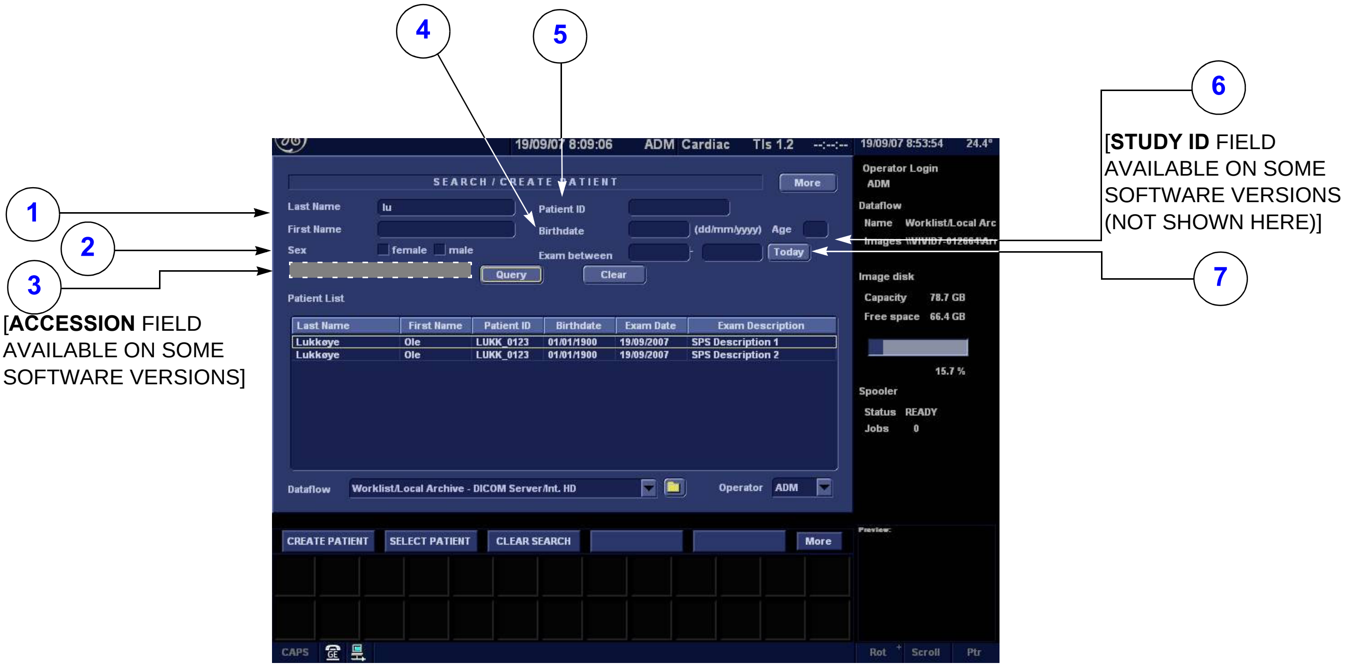
1
2
Insert Text
Comments
Insert Text
BEGIN EXAM
END EXAM
PATIENT INFO
SEARCH
IMAGE LIST
More
Preview:
CAPS
Scroll
Ptr

Figure 3-91 Examination List Screen

Table 3-19 Examination List Screen

ITEM	VIVID 7 FIELD NAME	DICOM TAG NUMBER	DICOM TAG NAME
1	REFERRAL REASON	(0010,2180)	ADDITIONAL PATIENT'S HISTORY
2	DIAGNOSIS	(0008,103E)	SERIES DESCRIPTION

3-9-18-4 Worklist Search Screen


1
2
3
4
5
6
7
19/09/07 8:09:06
ADM Cardiac
TIs 1.2
--:--:--
19/09/07 8:53:54
24.4°
SEARCH / CREATE PATIENT
More
Query
Clear
Today
(dd/mm/yyyy)
CREATE PATIENT
SELECT PATIENT
CLEAR SEARCH
More
Preview:
CAPS
Rot
Scroll
Ptr

Last Name lu
First Name
Sex ☐ female ☐ male
Patient ID
Birthdate (dd/mm/yyyy) Age
Exam between

Patient List

Last Name	First Name	Patient ID	Birthdate	Exam Date	Exam Description
Lukkøye	Ole	LUKK_0123	01/01/1900	19/09/2007	SPS Description 1
Lukkøye	Ole	LUKK_0123	01/01/1900	19/09/2007	SPS Description 2

Dataflow Worklist/Local Archive - DICOM Server/Int. HD
Operator ADM

Operator Login
ADM
Dataflow
Name Worklist/Local Arc
Images \\VIVID7-012664\Arc
Image disk
Capacity 78.7 GB
Free space 66.4 GB
15.7 %
Spooler
Status READY
Jobs 0

[**ACCESSION** FIELD AVAILABLE ON SOME SOFTWARE VERSIONS]

[**STUDY ID** FIELD AVAILABLE ON SOME SOFTWARE VERSIONS (NOT SHOWN HERE)]

Figure 3-92 Worklist Search Screen

Table 3-20 Worklist Search Screen

ITEM	VIVID 7 FIELD NAME	DICOM TAG NUMBER	DICOM TAG NAME
1	LAST NAME, FIRST NAME	(0010,0010)	PATIENT'S NAME
2	SEX	(0010,0040)	PATIENT'S SEX
3	ACCESSION	(0008,0050)	ACCESSION NUMBER
4	BIRTHDATE	(0010,0030)	PATIENT'S BIRTHDATE
5	PATIENT ID	(0010,0020)	PATIENT ID
6	STUDY ID	(0040,1001)	REQUESTED PROCEDURE ID
7	EXAM BETWEEN	(0040,0002)	SCEDULED PROCEDURE STEP START DATE

Section 3-10
Connectivity Setup - Software v3.x

NOTE: *If connected to a stand-alone network (Peer-to-Peer network with a Vivid 7 scanner, an EchoPAC PC Workstation and an optional network printer), you should use default delivery settings.*

3-10-1 Introduction

To be able to use the network functions when connected to a hospital network, the scanner must have a proper network address.

- Before you can set up the scanner, you need to collect some information. The "Pre-quote Worksheet for DICOM Network Information" on page 2-14 can be used for gathering this information. Typical source for this information is the network administrator.
- Follow the steps below to prepare the scanner for use on the network.

3-10-2 Contents in this Section

- 3-10-3 "Compatibility" on page 3-89
- 3-10-4 "Select TCP/IP Set-up Screen - Software Version v3.x" on page 3-90
- 3-10-5 "Set the Scanner’s Network Information - Software Version v3.x" on page 3-91
- 3-10-6 "Set the Remote Archive’s Network Information - Software Version v3.x" on page 3-92
- 3-10-7 "Save the New Settings" on page 3-92
- 3-10-8 "Connect to a DICOM Server in a Network - Software Version v3.x" on page 3-93
- 3-10-9 "HL7 Communication Setup - Software v3.x" on page 3-98
- 3-10-10 "Query/Retrieve (Q/R) Setup for Software v3.x" on page 3-102

3-10-3 Compatibility

Vivid 7 with Software Version v3.3.x (System Software v1.5.1) can communicate with:

- EchoPAC PC with software version v3.3.x
- EchoPAC PC with software version v4.x
- EchoPAC PC with software version v5.x
- EchoPAC PC with software version v6.x
- EchoPAC PC with software version v7.x
- Image Vault 3
- Image Vault 4
- EchoServer 7

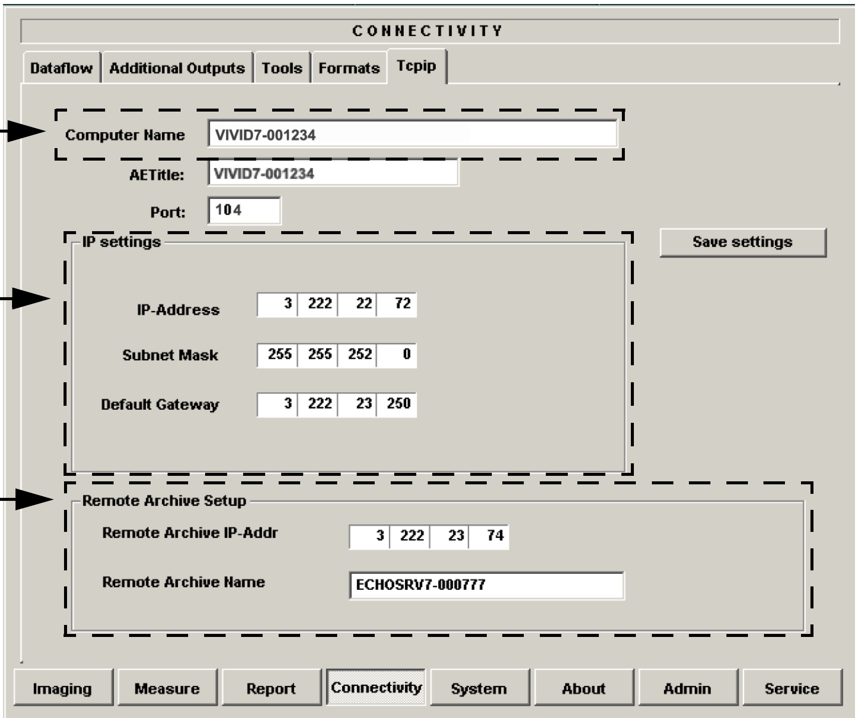
3-10-4 Select TCP/IP Set-up Screen - Software Version v3.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) If not already selected, select **CONNECTIVITY** from the bottom row of "buttons" on the screen.

3.) Select the TCP/IP TAB (it is named Tcpip).

.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name: VIVID7-001234

AETitle: VIVID7-001234

Port: 104

IP settings

IP-Address: 3 222 22 72

Subnet Mask: 255 255 252 0

Default Gateway: 3 222 23 250

Remote Archive Setup

Remote Archive IP-Addr: 3 222 23 74

Remote Archive Name: ECHOSRV7-000777

Computer Name:
For Vivid 7, this name is on the form: *Vivid7-00nnnn*, where "00nnnn" is a number (nnnn is the scanner's serial number).

IP SETTINGS:
IP SETTINGS AREA FOR THE Vivid 7 SCANNER.
DEFAULT SETUP:
IP-ADDRESS: 10.0.0.3
SUBNET MASK: 255.255.255.255
GATEWAY: 0.0.0.0

Remote Archive Setup area:
IP settings area for a Remote Archive.
Example: EchoServer.
Default Setup:
Remote Archive IP-Addr: 10.0.0.4
Remote Archive Name: EchoPAC7-000001

The AETitles field and the Port field are only available on BT'03 software (and beyond).

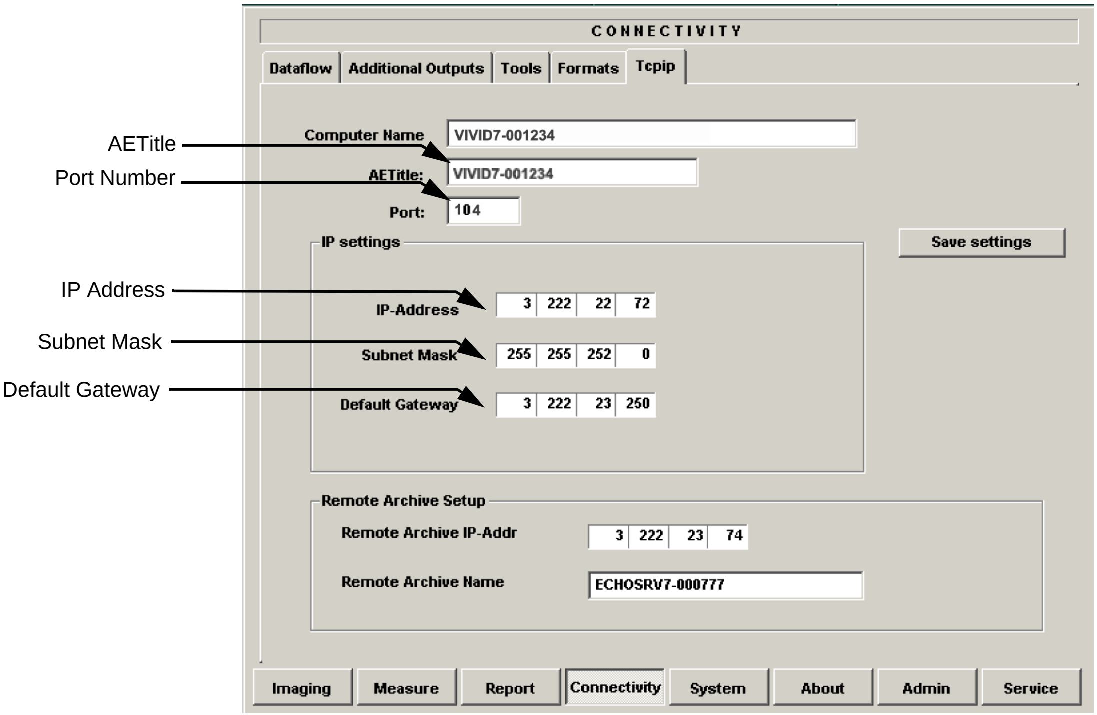
Figure 3-93 TCP/IP Set-up screen for Vivid 7, Overview (Example)

3-10-5 Set the Scanner’s Network Information - Software Version v3.x

In the IP settings area of the screen, enter the;

1.) IP Address for scanner. (Default IP Address from factory: 10.0.0.3).
2.) Subnet Mask for scanner. (Default Subnet Masks from factory: 255.255.255.0).
3.) IP address for Default Gateway. (Default Gateways from factory IP address: 0.0.0.0).
4.) In addition, the AE Title for the scanner must be entered in the DICOM server’s setup.

.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
AETitle
Port Number
IP Address
Subnet Mask
Default Gateway
IP settings
Save settings
Remote Archive Setup
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name: VIVID7-001234
AETitle: VIVID7-001234
Port: 104

IP-Address: 3 222 22 72
Subnet Mask: 255 255 252 0
Default Gateway: 3 222 23 250

Remote Archive IP-Addr: 3 222 23 74
Remote Archive Name: ECHOSRV7-000777

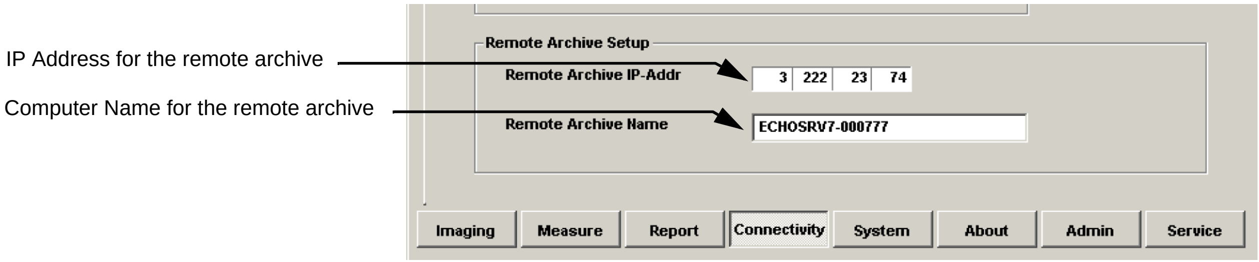
Figure 3-94 TCP/IP Set-up for Vivid 7

3-10-6 Set the Remote Archive's Network Information - Software Version v3.x

In the Remote Archive Setup area of the screen (see example in Figure 3-95), enter the;

1.) Remote Archive IP address. (Default IP Address from factory: 10.0.0.4).
2.) Remote Archive Name. (Default Remote Archive Name from factory: ECHOPAC7-000001).

.



IP Address for the remote archive

Computer Name for the remote archive

Remote Archive Setup
Remote Archive IP-Addr: 3 222 23 74
Remote Archive Name: ECHOSRV7-000777

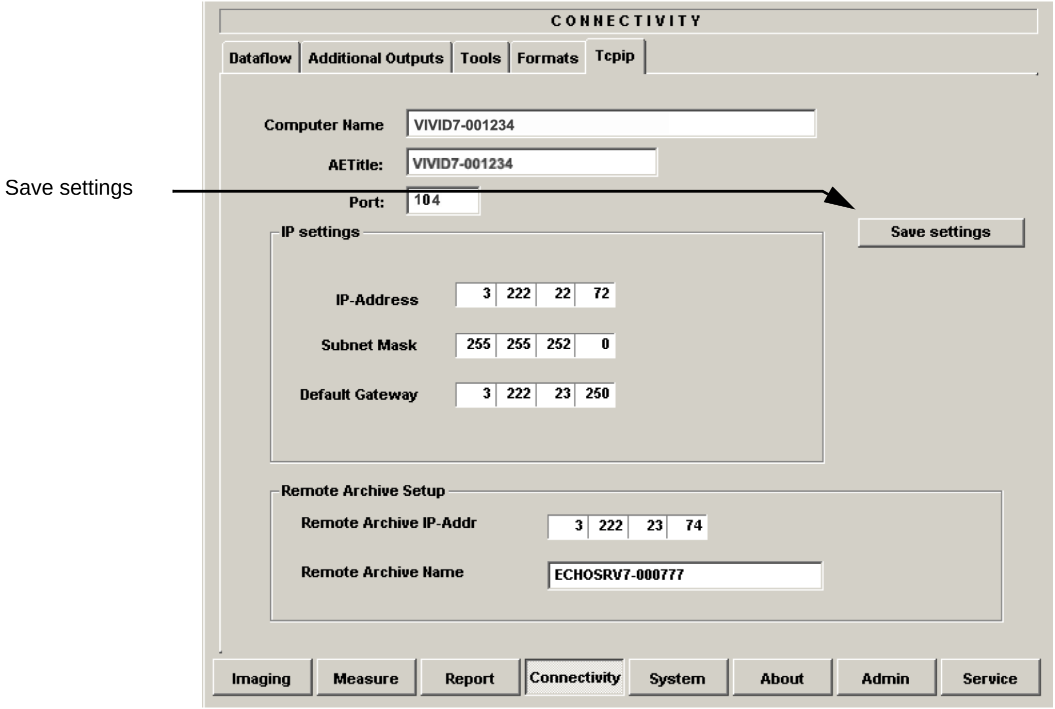
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Figure 3-95 TCP/IP Set-up for Vivid 7

3-10-7 Save the New Settings

1.) Press **SAVE SETTINGS** to save the new settings.

.



Save settings

CONNECTIVITY
Computer Name: VIVID7-001234
AETitle: VIVID7-001234
Port: 104
IP settings
IP-Address: 3 222 22 72
Subnet Mask: 255 255 252 0
Default Gateway: 3 222 23 250
Remote Archive Setup
Remote Archive IP-Addr: 3 222 23 74
Remote Archive Name: ECHOSRV7-000777

Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Figure 3-96 Save New TCP/IP settings

2.) The new settings are saved to a common settings file. After a restart, the settings are also included in other screens.
3.) Restart Vivid 7 to activate the changes.

3-10-8 Connect to a DICOM Server in a Network - Software Version v3.x

In this case the Vivid 7 is configured to work with DICOM servers in a network environment. Images are first saved on the local image buffer on the scanner. At the end of the examination the images are sent to the DICOM server via a DICOM spooler and to the local database, depending on dataflow.

This scenario requires that the scanner is configured to be connected to DICOM servers as described below.

3-10-8-1 Overview

To work against the DICOM server, the following information has to be entered in the scanner:

- The DICOM server IP address.
- The DICOM server port number.
- The DICOM server AE title (the server application's name).
- Name of Device.

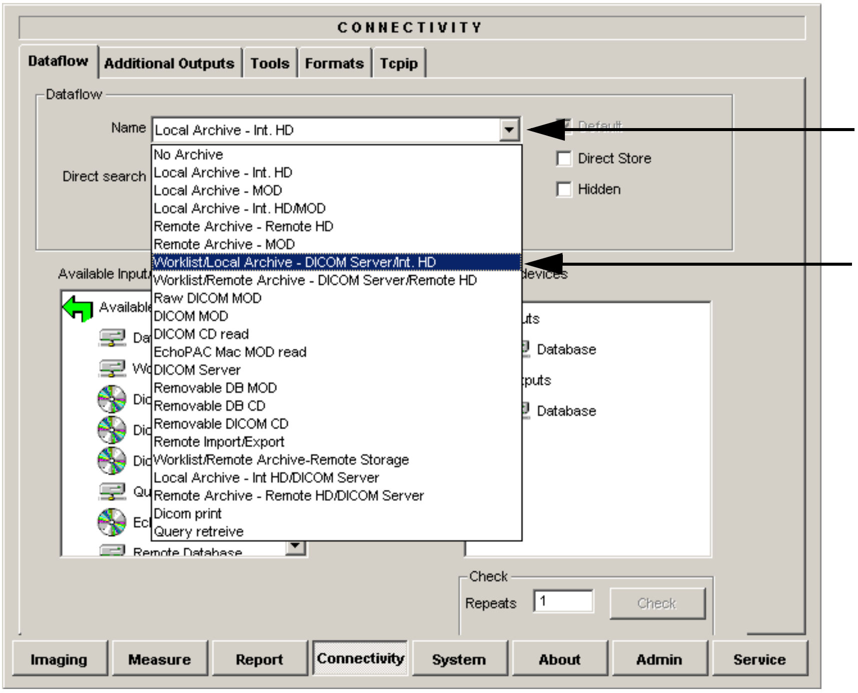
3-10-8-2 DICOM Server IP Address Setting on the Scanner - Software Version v3.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **CONNECTIVITY** (in the lower part of the window).

3.) Select the **DATAFLOW** tab.

4.) Select the arrow to the right for the Name field to list all dataflows in a pull-down menu, see Figure 3-97.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Name
Local Archive - Int. HD
Direct search
Default
Direct Store
Hidden
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote HD
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable DB MOD
Removable DB CD
Removable DICOM CD
Remote Import/Export
Worklist/Remote Archive-Remote Storage
Local Archive - Int HD/DICOM Server
Remote Archive - Remote HD/DICOM Server
Dicom print
Query retreive
Available Input
Available
Remote Database
Database
Database
Check
Repeats
1
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Arrow

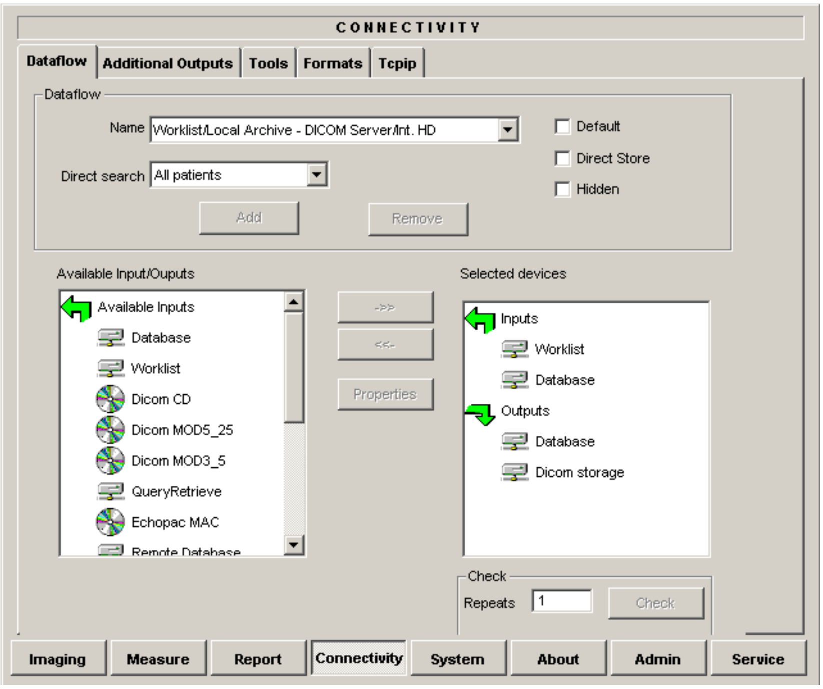
Select dataflow from Dataflow Name pull-down menu.

Figure 3-97 Select Dataflow

5.) Select the dataflow you want to configure from the Dataflow Name pull-down list, see Figure 3-97.

3-10-8-2 DICOM Server IP Address Setting on the Scanner - Software Version v3.x (cont'd)

In Figure 3-98, the selected flow, Worklist/Local Archive - DICOM Server/Int. HD, is shown.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available Input/Ouputs
Selected devices
->>
<<-
Properties
Check
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Name: Worklist/Local Archive - DICOM Server/Int. HD
Direct search: All patients
☐ Default
☐ Direct Store
☐ Hidden

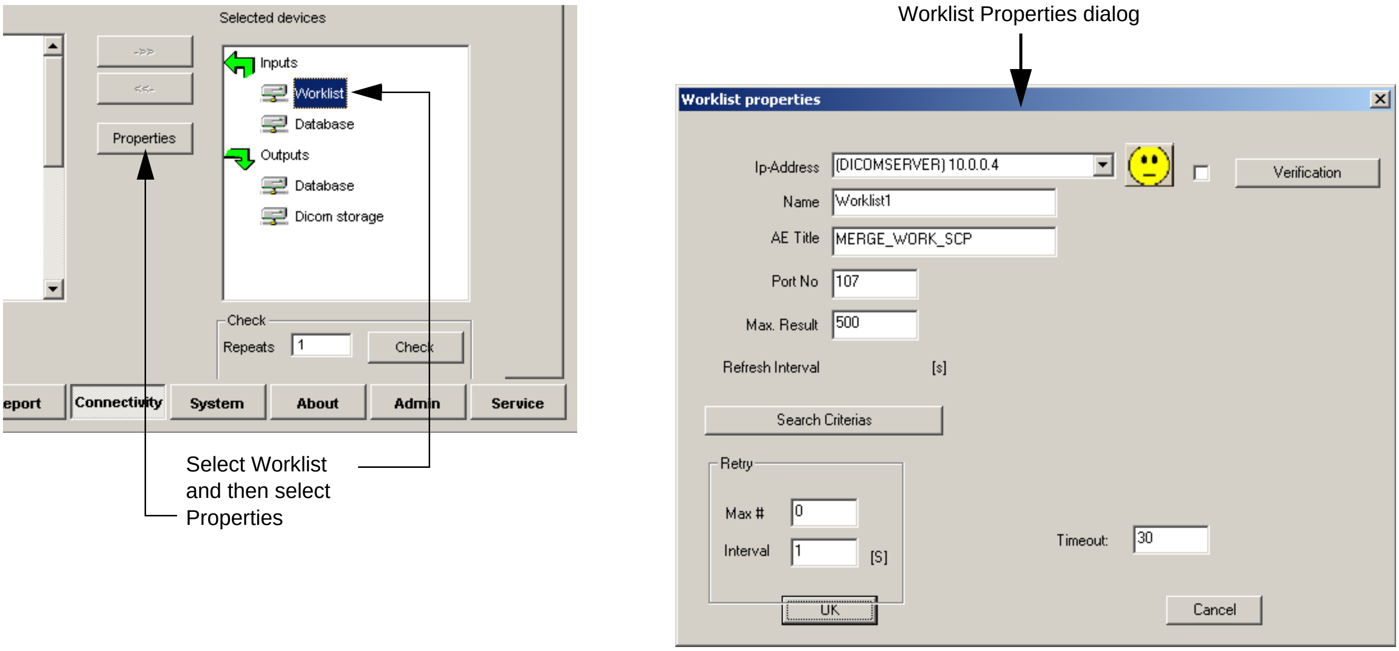
Available Input/Ouputs:
- Available Inputs
  - Database
  - Worklist
  - Dicom CD
  - Dicom MOD5_25
  - Dicom MOD3_5
  - QueryRetrieve
  - Echopac MAC
  - Remote Database

Selected devices:
- Inputs
  - Worklist
  - Database
- Outputs
  - Database
  - Dicom storage

Repeats: 1

Figure 3-98 Worklist/Local Archive - DICOM Server/Int. HD flow

6.) Select Worklist (so it is highlighted) and then select Properties to display the Properties dialog.


Selected devices
->>
<<-
Properties
Inputs
Worklist
Database
Outputs
Database
Dicom storage
Check
Repeats
Check
eport
Connectivity
System
About
Admin
Service
Worklist properties
Verification
Search Criterias
Retry
OK
Cancel

Worklist Properties dialog

Select Worklist and then select Properties

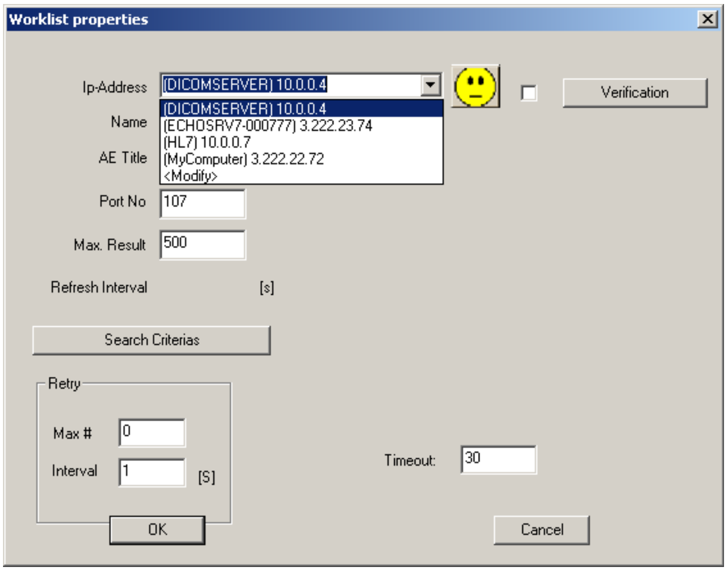
Ip-Address: (DICOMSERVER) 10.0.0.4
Name: Worklist1
AE Title: MERGE_WORK_SCP
Port No: 107
Max. Result: 500
Refresh Interval [s]
Retry: Max # 0, Interval 1 [S]
Timeout: 30

Figure 3-99 Select Worklist Properties dialog

3-10-8-2 DICOM Server IP Address Setting on the Scanner - Software Version v3.x (cont'd)

7.) Select the IP-Address down-arrow to choose the Worklist Server from the pull-down menu.

NOTE: *It is not possible to change the setting in the IP-Address field by editing it. See description below, starting with step 8, to change the setting.*


Worklist properties
(DICOMSERVER) 10.0.0.4
(ECHOSRV7-000777) 3.222.23.74
(HL7) 10.0.0.7
(MyComputer) 3.222.22.72
<Modify>
Verification
Search Criterias
OK
Cancel

Ip-Address (DICOMSERVER) 10.0.0.4
Name
AE Title
Port No 107
Max. Result 500
Refresh Interval [s]
Retry
Max # 0
Interval 1 [S]
Timeout: 30

Figure 3-100 DICOM Server's Properties dialog

8.) Follow the steps below to change the IP-Address settings:

a.) From the Ip-Address pull-down menu, select <Modify> to display the IPs dialog.

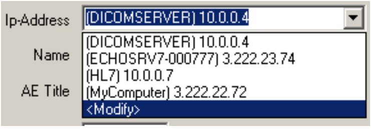

Ip-Address
Name
AE Title
(DICOMSERVER) 10.0.0.4
(DICOMSERVER) 10.0.0.4
(ECHOSRV7-000777) 3.222.23.74
(HL7) 10.0.0.7
(MyComputer) 3.222.22.72
<Modify>

Figure 3-101 Select <Modify>

b.) Select the server you want to modify from the IPs dialog and then select Modify.

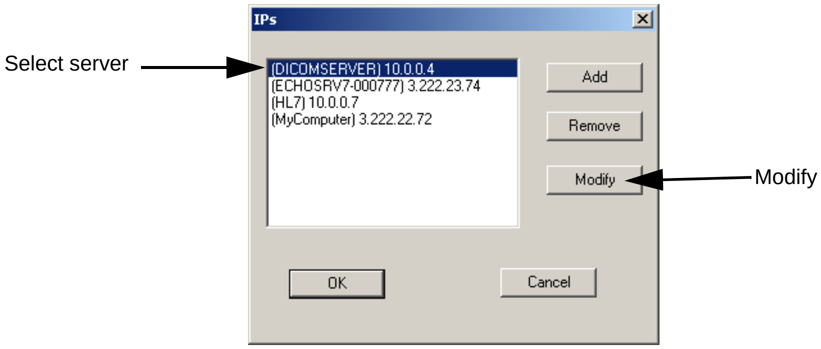
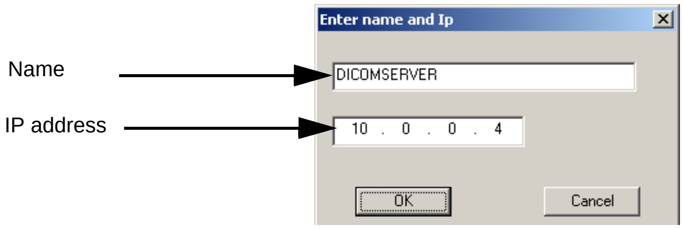

Select server
IPs
(DICOMSERVER) 10.0.0.4
(ECHOSRV7-000777) 3.222.23.74
(HL7) 10.0.0.7
(MyComputer) 3.222.22.72
Add
Remove
Modify
OK
Cancel
Modify

Figure 3-102 Select the unit to modify

3-10-8-2 DICOM Server IP Address Setting on the Scanner - Software Version v3.x (cont'd)

c.) Edit the name and/or the IP address of the server, see Figure 3-103.



Enter name and Ip

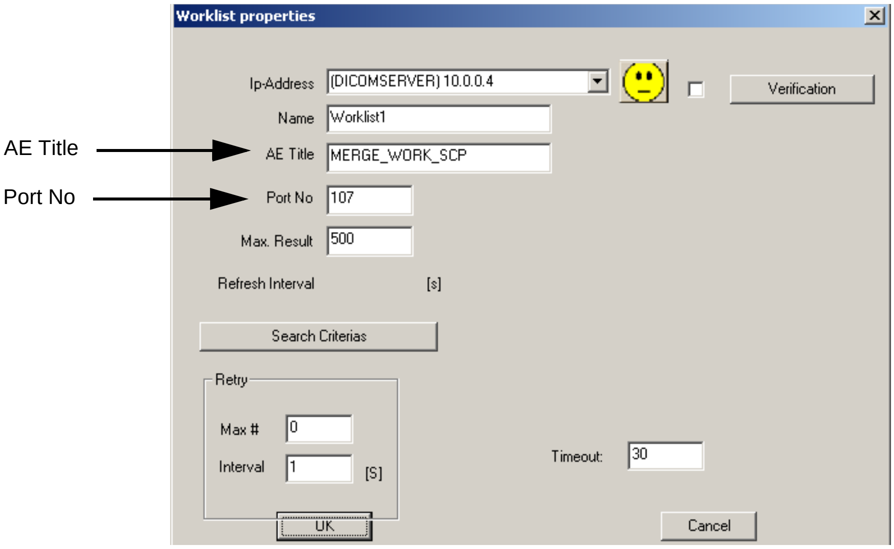
DICOMSERVER

10 . 0 . 0 . 4

Figure 3-103 Edit Name and/or IP address

d.) Select OK to save the new settings and close the dialog.

e.) Select OK to close the IPs dialog to return to the Properties dialog.



Worklist properties

Ip-Address: (DICOMSERVER) 10.0.0.4 ☐
Name: Worklist1
AE Title: MERGE_WORK_SCP
Port No: 107
Max. Result: 500
Refresh Interval: [s]
Retry
Max #: 0
Interval: 1 [S]
Timeout: 30

Figure 3-104 DICOM Server's Properties dialog

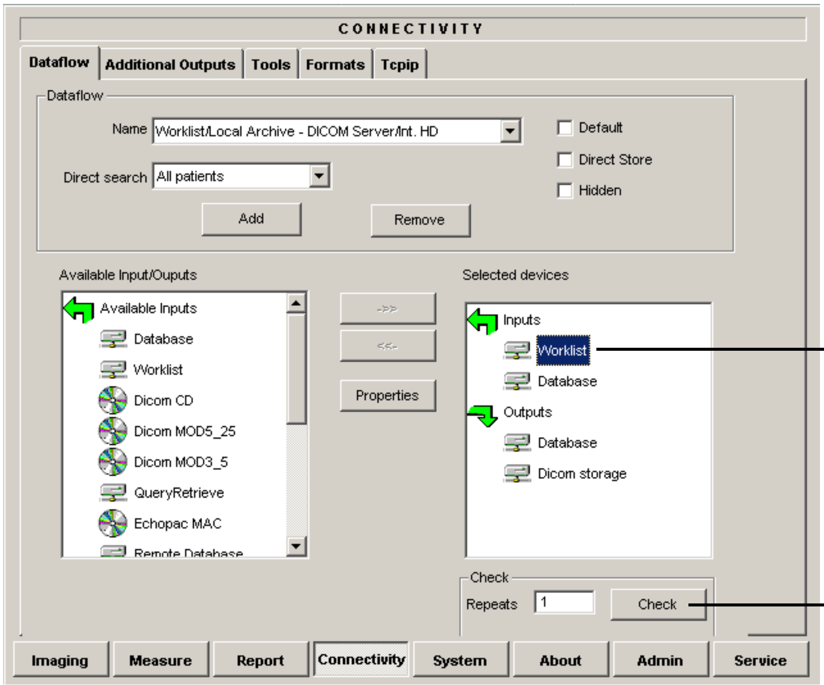
f.) Enter the DICOM server AE Title. This entry is case sensitive and must match exactly.

g.) Enter the DICOM server port.

h.) Select OK to close the Worklist properties dialog and save any changes.

3-10-8-3 Verify the Connection to a Device - Software Version v3.x

1.) Select (highlight) the device you want to verify the connection to.



Name: Worklist/Local Archive - DICOM Server/Int. HD

Direct search: All patients

☐ Default
☐ Direct Store
☐ Hidden

Repeats: 1

CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available Input/Ouputs
Available Inputs
Database
Worklist
Dicom CD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
->>
<<-
Properties
Selected devices
Inputs
Worklist
Database
Outputs
Database
Dicom storage
Check
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

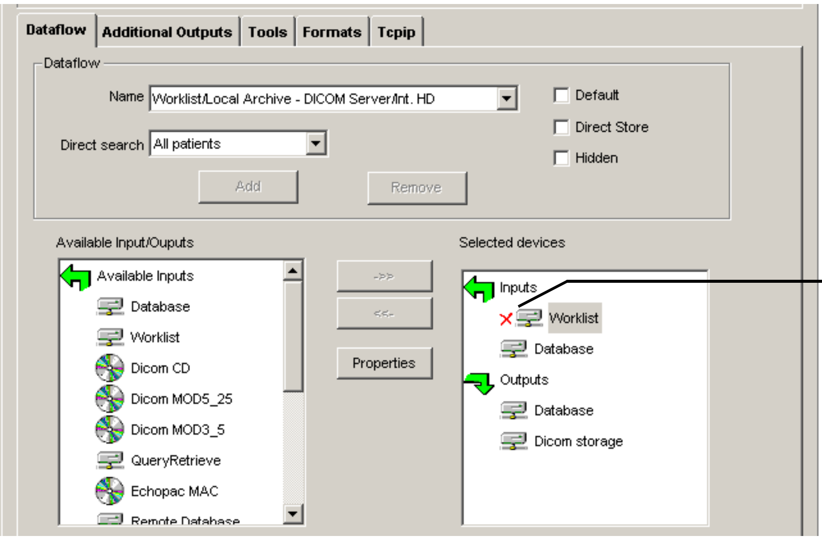
Select device to be verified.

Check

Figure 3-105 Verify connection to a device

2.) Select **CHECK** to start the verification process of the connection to the device.
The verification process may use some amount of time (several seconds). When done, a sign in front of the device indicates if the test passed (green check-mark) or failed (red X).

NOTE: *If the Check button fails directly, the AE Title is probably wrong.*
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.



Name: Worklist/Local Archive - DICOM Server/Int. HD

Direct search: All patients

☐ Default
☐ Direct Store
☐ Hidden

Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available Input/Ouputs
Available Inputs
Database
Worklist
Dicom CD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
->>
<<-
Properties
Selected devices
Inputs
✗ Worklist
Database
Outputs
Database
Dicom storage

A green check-mark indicates that the test passed.
A red cross (as illustrated) indicates that the connection failed.

Figure 3-106 Verification result

3-10-9 HL7 Communication Setup - Software v3.x

3-10-9-1 Introduction

The procedures below tell you how to set up the Vivid 7 so it can connect to the Hospital Information System (HIS), via the Vivid HL7 Gateway. By connecting to the HIS, demographic information i.e Patient ID, Name, Gender etc. can be pulled from the HIS, reducing “double-work” and typing errors. Patient Reports can be sent back to the HIS for storage together with the rest of the Patient records.

3-10-9-2 Preparations

1.) Before you can set up the HL 7 Communication, you need to collect some information.
   - The IP address of the Vivid HL7 Gateway
   - Port Number used by the Vivid HL7 Gateway (Default port: 3320)

   Typical source for this information is the Mitra support personnel.

   Figure 2-2 "Pre-quote Worksheet for DICOM Network Information" on page 2-14 can be used for gathering this information.

2.) Provide the computer name of each EchoPAC PC Workstation and Vivid 7 being configured, to the Mitra support personnel.

3-10-9-3 Configuration of Modality Worklist Services - Software v3.x

---

Identify Dataflow to be Used

1.) Identify which dataflow is to be used at the site. If they will be using DICOM Modality Worklist, then the dataflow must include a Worklist service.
2.) On the Connectivity screen, select the Dataflow tab.
3.) Select the name of the site's dataflow from the pull-down.
4.) In the Services section, locate the Worklist service.
5.) Record the service's name and destination device.

Configure the DICOM Worklist Service

1.) Select the Services tab.
2.) Select the Worklist destination device from the pull down menu.
3.) Enter the IP address of the Vivid HL7 Gateway.
4.) Enter a descriptive name in the Name field. Example: Vivid HL7 Gateway. The use of this field is optional).
5.) Enter AE Title. Use the Computer Name for the unit you are configuring.
6.) Enter Port Number. Port 3320 is default, but Mitra may have provided another port number.
7.) Set Time-out to 90.
8.) Leave the rest of the fields unchanged.

3-10-9-3 Configuration of Modality Worklist Services - Software v3.x (cont'd)

Configure the Search Criterias

NOTE: This configuration is required.

1.) Select the Search Criterias button.
2.) Select the criteria Modality and select the Remove button.
3.) Press the OK button.

Configure Search Criterias: Constrain Query by AE Title

NOTE: This configuration is optional. It should only be performed if the site is directing orders to the Vivid 7 that is scheduled to perform the study.

Please contact the Mitra support personnel to verify that this step is needed.

1.) In the Search Criterias dialog box, select 00400001 Scheduled Station AE Title from the Select Tag pull down menu.
2.) Enter the Vivid 7 computer name for the Value.
3.) Press the Add to List button.
4.) Press the OK button.

Configure Search Criterias: Constrain Query by MRN

NOTE: This configuration should be performed if the site will need to constrain the Worklist queries by MRN (patient id)

1.) In the Search Criterias dialog box, select 00101000 Other Patient IDs from the Select Tag pull down menu.
2.) Enter a 9 digit number for the Value.
3.) Select the Add to List button.
4.) Select the OK button.

Assign Dicom Worklist name to Dataflow

1.) Select the Dataflow tab.
2.) From the Dataflow name pull down menu, select the Dataflow which will be used.
3.) Remove the Dicom Worklist service currently used in the Dataflow.
4.) From the Select Service pull down menu, select the Gateway Modality Worklist service.
5.) Select the Add button.
6.) Ensure that the service is displaying the value In for the Dir parameter and that its role is Primary.

3-10-9-3 Configuration of Modality Worklist Services - Software v3.x (cont'd)

Test Connectivity with the Vivid HL7 Gateway

The purpose of this test is to verify that the Vivid 7 has connectivity with the Vivid HL7 Gateway.

1.) From either the Current or Dataflow view, expand the Dataflow incorporating the Gateway Modality Worklist service.
2.) Expand the Gateway destination device.
3.) Select the Gateway Modality Worklist service.
4.) Select the Check button.
    - If connectivity was achieved, then there should be a green check next to the name of the Gateway's Modality Worklist service.
    - If connectivity was not achieved, then there will be a red X next to the name of the Gateway's Modality Worklist service.

NOTE: If the Check button fails directly, the AE Title is probably wrong.
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

Troubleshoot Connectivity with the Gateway

Typical causes if connection between Vivid 7 and HIS failed:

1.) No network connection.
2.) IP address and/or port number was incorrectly entered when configuring the Gateway Modality Worklist service.
3.) Mitra support personnel have not configured the Gateway yet to accept Modality Worklist queries from the Vivid 7.
4.) Verify that the Vivid 7 computer name matches the value specified for the Gateway Modality Worklist service and that it also matches the value supplied to the Mitra support personnel.

Configure the Export to HL7 Path

1.) Enter the configuration screen for the EchoPAC PC.
2.) Press the Connectivity button.
3.) Select the Tools tab.
4.) In the section labeled Export Paths, make the following changes:
    a.) For the Export To HL7 path, enter the following information:
    \\ < Name or IP Address of the Vivid HL7 Gateway>\POLL_DIR

Example: \\Gateway\POLL_DIR

    b.) Verify that Text is select for the Export file format.

3-10-9-3 Configuration of Modality Worklist Services - Software v3.x (cont'd)

Test Connectivity with the Vivid HL7 Gateway

1.) Start a new study and acquire an image, or use an existing study.
2.) In the Measurements mode, make some of the measurements.
3.) In the Report screen, create and store a report.
4.) In the Patient screen, select the study that you created the report in from the Examination List.
5.) From the More pull down menu, select HL7 Results.
6.) If the export was successful, then you should get the message:
Export exam status: OK.
7.) If the export was not successful, then you should get the message,
Export exam status: Unable to copy file or something similar.

Troubleshoot Connectivity with the Vivid HL7 Gateway

Typical causes if Connectivity with the Vivid HL7 Gateway failed:

1.) Path provided in Export to HL7 export path was incorrect.
2.) Mitra support personnel did not create the user account for the Vivid 7.

NOTE: *Required setup on the remote share:*
User: E1c2h3o4C5l6i7e8n9t
Password: u1l3t5r7a

3.) The POLL_DIR directory on the Vivid HL7 Gateway was not shared or the permissions are incorrect. Verify with Mitra support personnel.
4.) Domain or other network issue.
5.) If Report files (ReportXXX.chm) are not exported to the Vivid HL7 Gateway, then the reports may not have been stored when they were created on the Vivid 7.

3-10-10 Query/Retrieve (Q/R) Setup for Software v3.x

3-10-10-1 Overview

Query/Retrieve was introduced with the V3.0 software.

The Query/Retrieve function makes it possible to search for and retrieve DICOM data from a DICOM server for further analysis on the Vivid 7.

NOTE: You may have to set up Vivid 7 as a destination on the server.

3-10-10-2 Query/Retrieve Setup on the Vivid 7

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) Select Connectivity
3.) Select Dataflow
4.) Select Query Retrieve from the Name pull down menu

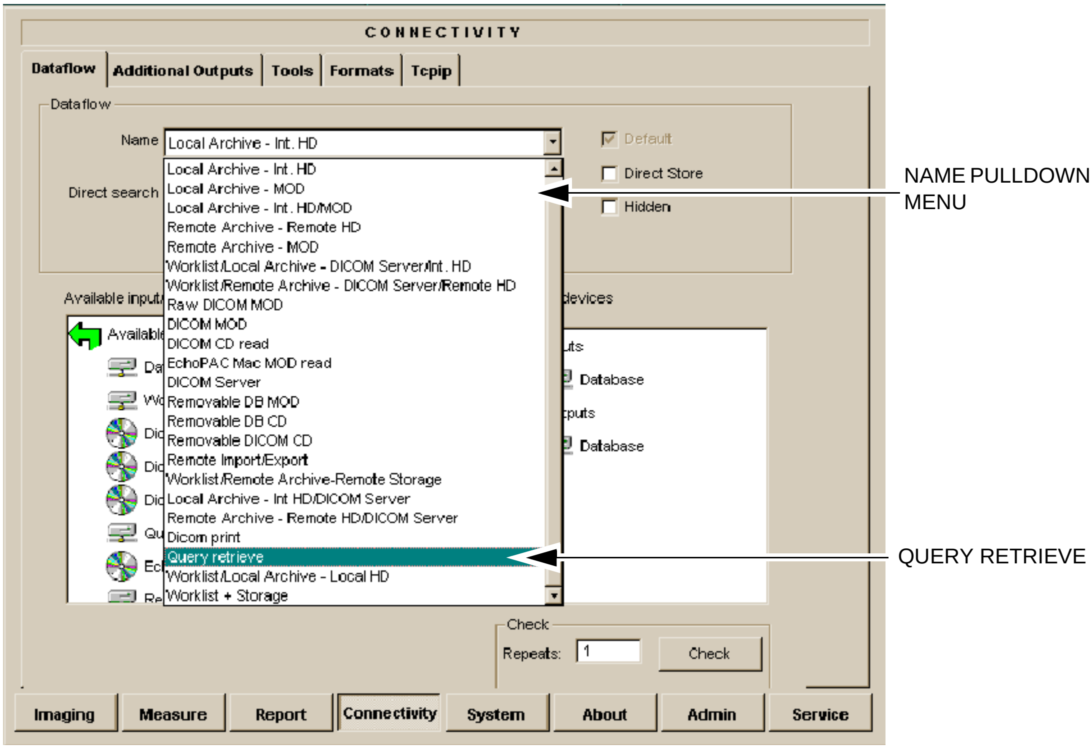
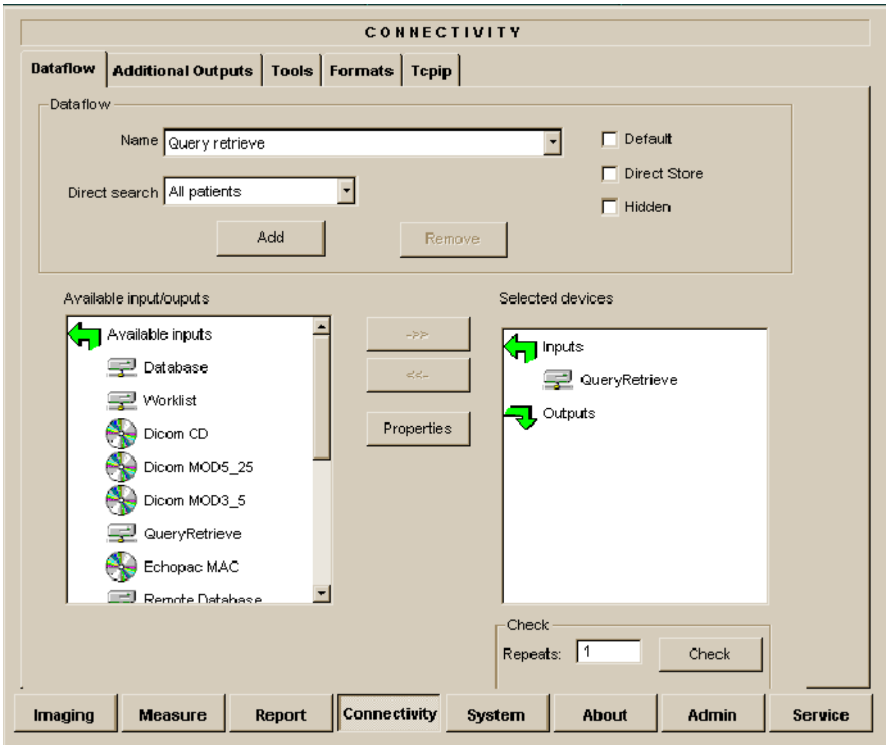

CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Name
Local Archive - Int. HD
Direct search
☑ Default
☐ Direct Store
☐ Hidden
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote HD
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable DB MOD
Removable DB CD
Removable DICOM CD
Remote Import/Export
Worklist/Remote Archive-Remote Storage
Local Archive - Int HD/DICOM Server
Remote Archive - Remote HD/DICOM Server
Dicom print
Query retrieve
Worklist/Local Archive - Local HD
Worklist + Storage
Available input
devices
Database
Database
Check
Repeats: 1
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
NAME PULLDOWN MENU
QUERY RETRIEVE

Figure 3-107 Select Query Retrieve

3-10-10-2 Query/Retrieve Setup on the Vivid 7 (cont'd)

In Figure 3-108, the selected dataflow, Query/Retrieve, is shown.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Dataflow
Add
Remove
Available input/ouputs
Available inputs
Database
Worklist
Dicom CD
Dicom MOD5_25
Dicom MOD3_5
QueryRetrieve
Echopac MAC
Remote Database
->>
<<-
Properties
Selected devices
Inputs
QueryRetrieve
Outputs
Check
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Name: Query retrieve

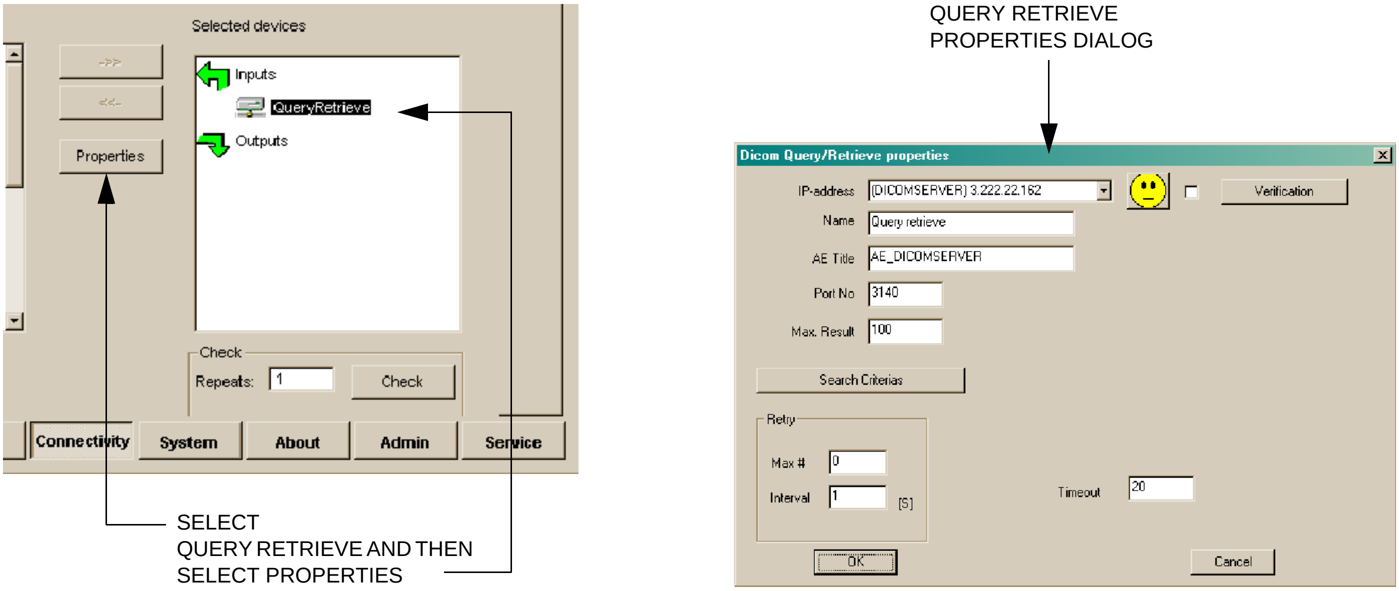
Direct search: All patients

☐ Default
☐ Direct Store
☐ Hidden

Repeats: 1

Figure 3-108 Query/Retrieve workflow

5.) Select QueryRetrieve so it is highlighted and then select Properties to display the Properties dialog.


Selected devices
->>
<<-
Properties
Inputs
QueryRetrieve
Outputs
Check
Repeats: 1
Check
Connectivity
System
About
Admin
Service
SELECT
QUERY RETRIEVE AND THEN
SELECT PROPERTIES
QUERY RETRIEVE
PROPERTIES DIALOG
Dicom Query/Retrieve properties
Verification
Search Criterias
Retry
OK
Cancel

IP-address: [DICOMSERVER] 3.222.22.162

Name: Query retrieve

AE Title: AE_DICOMSERVER

Port No: 3140

Max. Result: 100

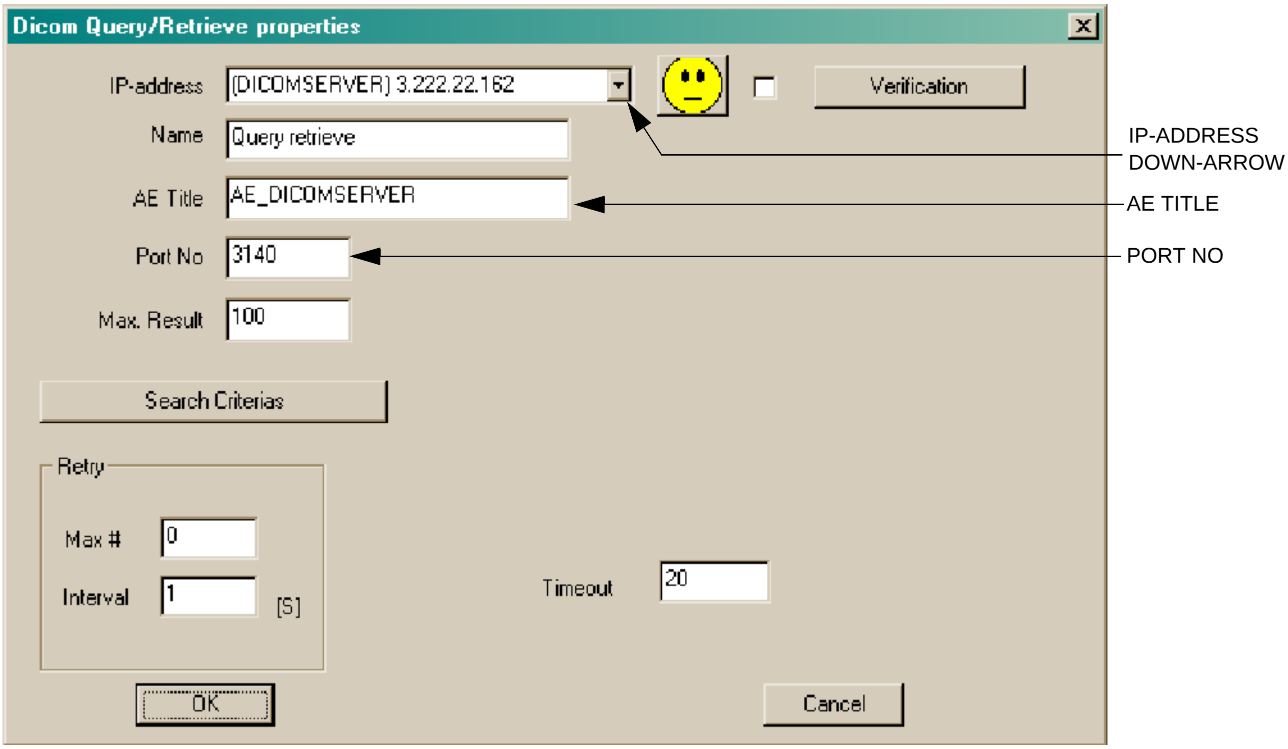
Max #: 0

Interval: 1 [S]

Timeout: 20

Figure 3-109 Select Query/Retrieve's Properties

3-10-10-2 Query/Retrieve Setup on the Vivid 7 (cont'd)


Dicom Query/Retrieve properties

IP-address: [DICOMSERVER] 3.222.22.162
Name: Query retrieve
AE Title: AE_DICOMSERVER
Port No: 3140
Max. Result: 100

Retry
Max #: 0
Interval: 1 [S]

Timeout: 20

Figure 3-110 DICOM Query/Retrieve properties

6.) Select the IP-address down-arrow to choose the DICOM Query/Retrieve server from the pull down menu. In some cases, the server to use is the same as used for DICOM Storage.

If the server to use is missing from the list, select <Modify> from the pull down menu and edit the setup for one of the predefined servers.

7.) Enter the correct AE Title and Port Number for the DICOM Query/Retrieve server in the respective fields in the Query/Retrieve screen.

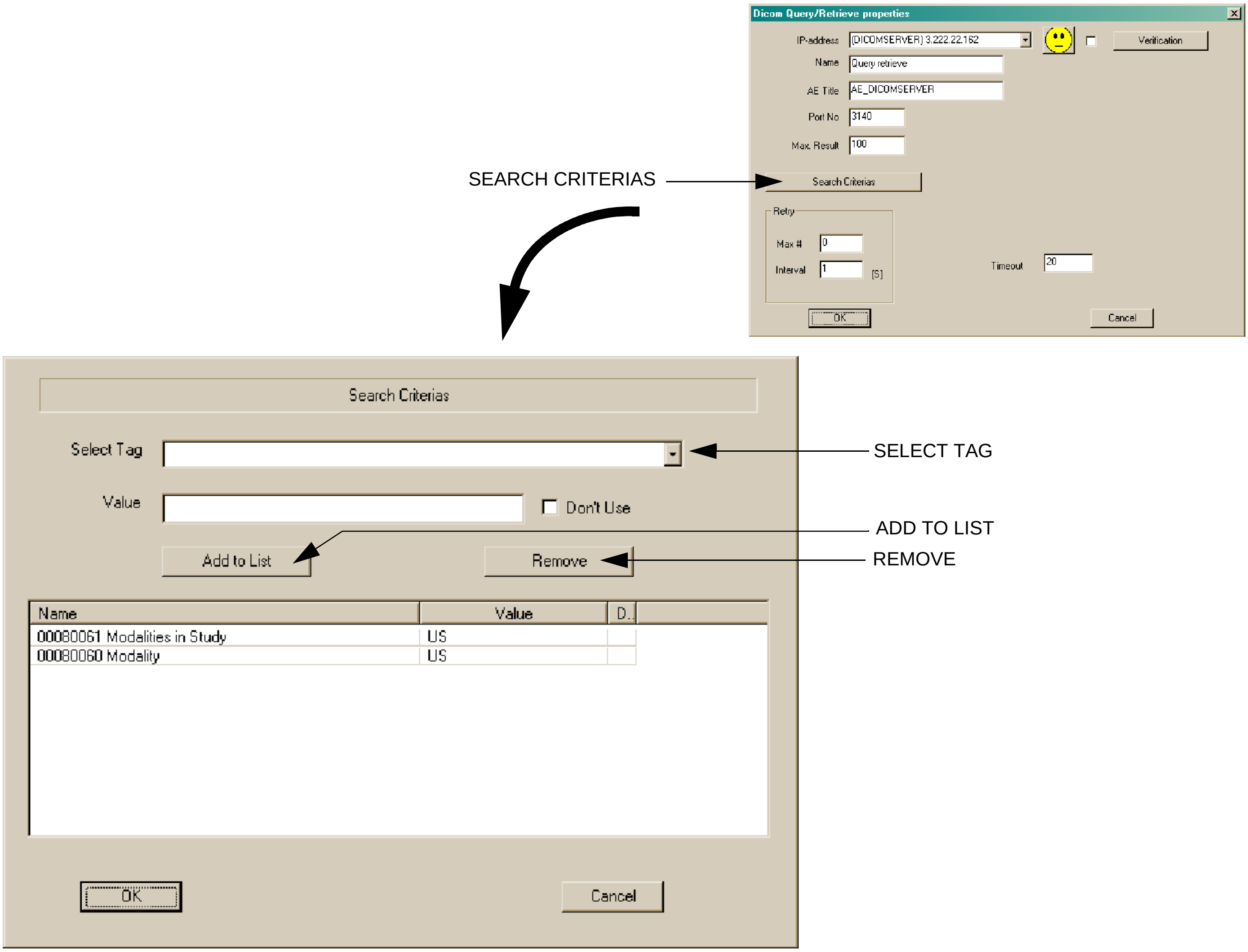
3-10-10-2 Query/Retrieve Setup on the Vivid 7 (cont'd)

Change Search Criterias

If is possible to set up special Search Criterias for DICOM Query/Retrieve. In most cases you may leave the Search Criterias as is, and skip this adjustment.

Follow the steps below to change the Search Criterias parameters:

1.) Select Search Criterias


SEARCH CRITERIAS
Dicom Query/Retrieve properties
Verification
Search Criterias
Retry
OK
Cancel
Search Criterias
SELECT TAG
Don't Use
ADD TO LIST
REMOVE
Add to List
Remove
OK
Cancel

IP-address: (DICOMSERVER) 3.222.22.162
Name: Query retrieve
AE Title: AE_DICOMSERVER
Port No: 3140
Max. Result: 100
Max #: 0
Interval: 1 [S]
Timeout: 20

Select Tag:
Value:
☐ Don't Use

Name	Value	D.
00080061 Modalities in Study	US	
00080060 Modality	US	

Figure 3-111 Select Search Criterias

2.) Select the correct tag from the Select Tag pull-down menu.

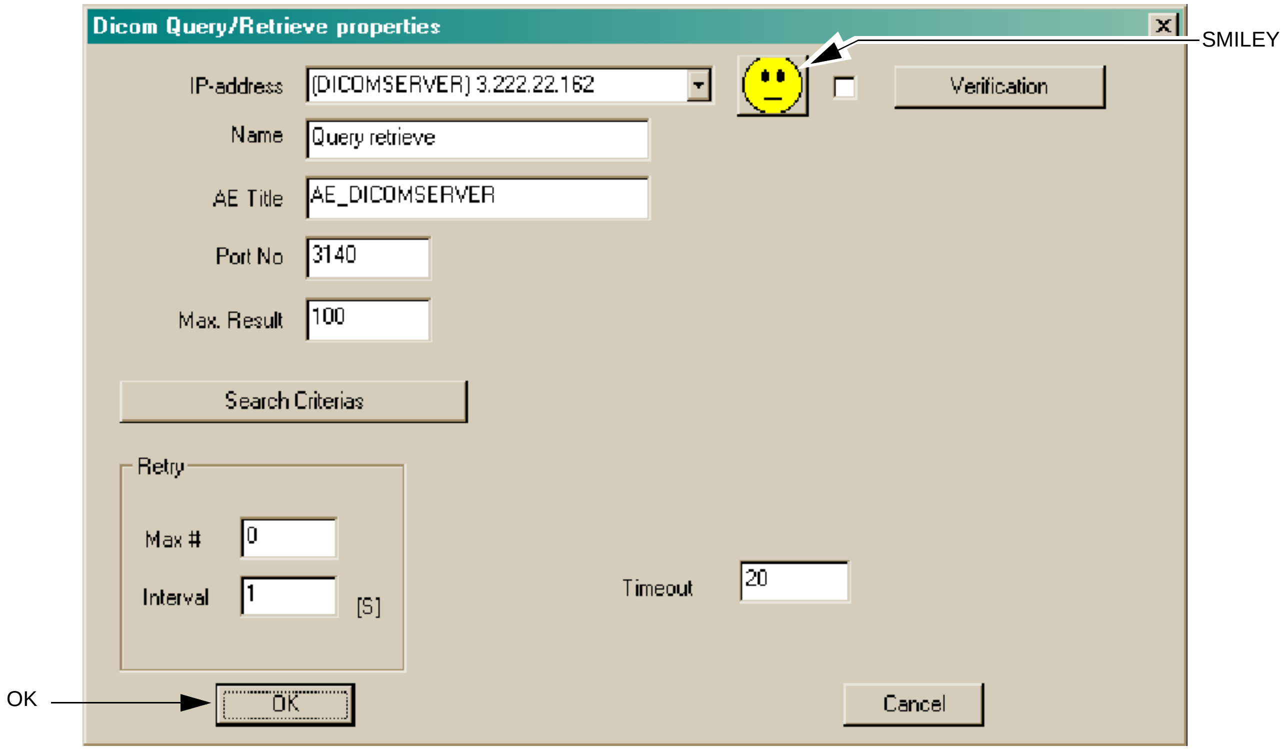
3.) If needed, type in the value.

NOTE: *In this example, tag 00080060 Modality has been added to the list with value "US". This may be useful if the studies contain non-ultrasound images.*

4.) Select Add to List

5.) Select OK to close the Search Criterias window.

3-10-10-3 Query/Retrieve Verification



IP-address: [DICOMSERVER] 3.222.22.162 ☐
Name: Query retrieve
AE Title: AE_DICOMSERVER
Port No: 3140
Max. Result: 100
Retry
Max #: 0
Interval: 1 [S]
Timeout: 20

Figure 3-112 DICOM Query/Retrieve properties

Follow the Steps Below to do a First Test (TCP-IP Ping) of the Connection

1.) Select the “Smiley” button to Ping the server.

NOTE: The smiley checks if the remote server is accessible (ping). It is not a DICOM Echo (DICOM ping), so it does not check AE title or port number.

2.) If the network connection to the server is OK, it will be illustrated by a smiling “Smiley” ☺.
A sad Smiley indicates that the network connection is failing.
Typical causes:
- Network cable not connected.
- Configuration error(s).

3.) When ready, select OK to close the DICOM Query/Retrieve properties and save changes.

3-10-10-3 Query/Retrieve Verification (cont'd)

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow

NOTE: *This check uses both Ping and DICOM Ping.*
- Ping is used to verify the TCP/IP connection to the server.
- DICOM Ping is used to verify that the DICOM application is answering

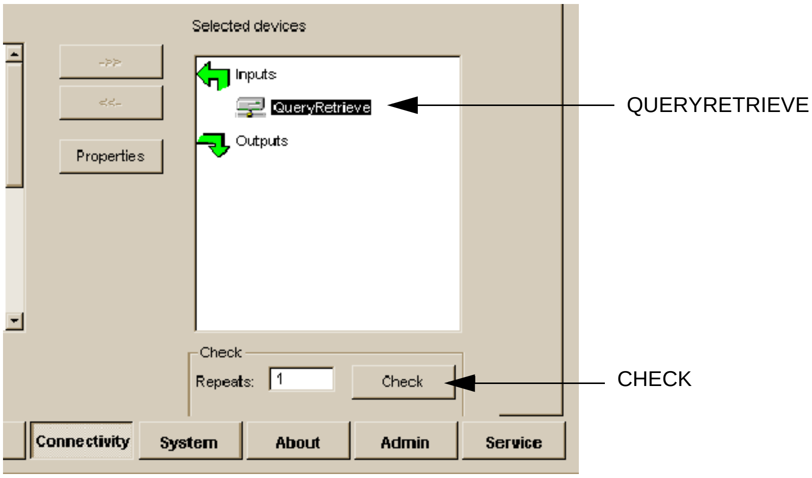
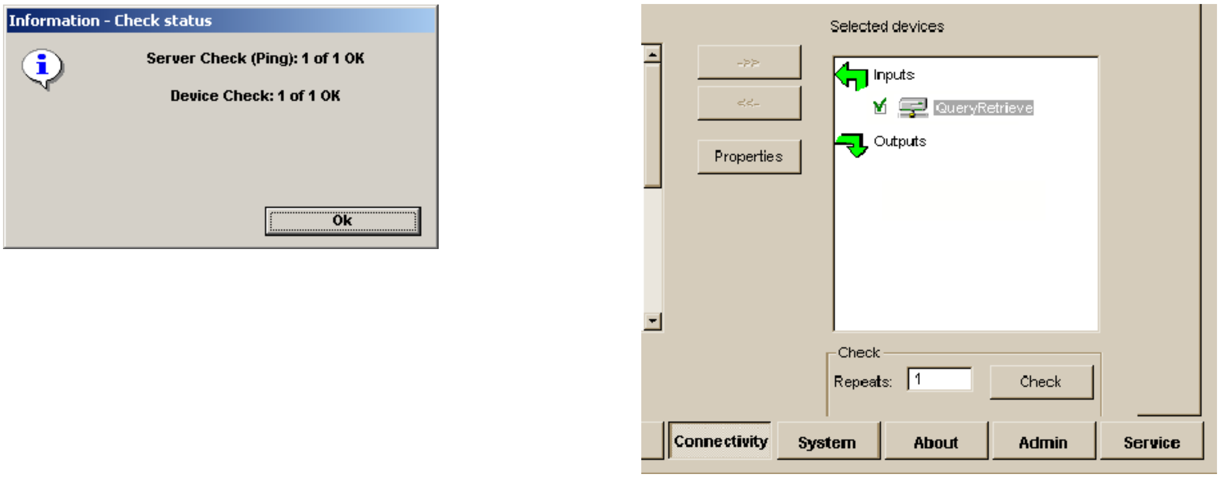

Selected devices
->>
<<-
Properties
Inputs
QueryRetrieve
Outputs
Check
Repeats: 1
Check
Connectivity
System
About
Admin
Service
QUERYRETRIEVE
CHECK

Figure 3-113 Check the DICOM Query/Retrieve workflow

1.) Select QueryRetrieve from the Selected devices list
2.) Select Check.
   - If the test pass, a pop-up dialog is displayed, see left illustration in Figure 3-114.

NOTE: *If the Check button fails directly, the AE Title is probably wrong.*
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

   - Select OK to continue. A green check mark to the left of the selected devices indicates that the test was successfully passed.


Information - Check status

Server Check (Ping): 1 of 1 OK

Device Check: 1 of 1 OK

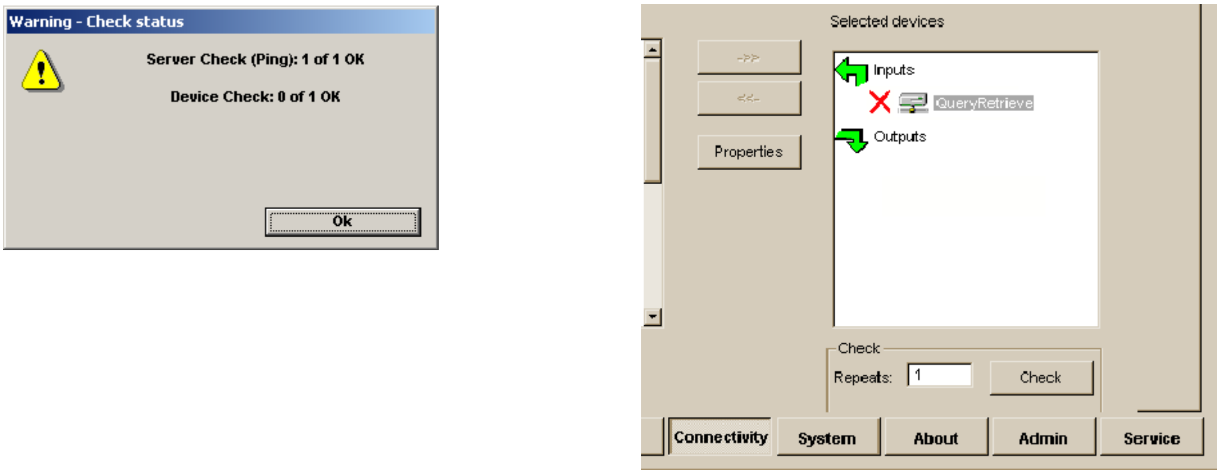
Ok
Selected devices
->>
<<-
Properties
Inputs
QueryRetrieve
Outputs
Check
Repeats: 1
Check
Connectivity
System
About
Admin
Service

Figure 3-114 Test (Check) Passed

3-10-10-3 Query/Retrieve Verification (cont'd)

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow (cont'd)

- If the test fail, a pop-up warning is displayed, see left illustration in Figure 3-115.
  Select OK to continue. A red “X” to the left of the Selected devices indicates that the test failed.


Warning - Check status

Server Check (Ping): 1 of 1 OK

Device Check: 0 of 1 OK

Repeats: 1

Ok
Selected devices
->>
<<-
Properties
Inputs
QueryRetrieve
Outputs
Check
Check
Connectivity
System
About
Admin
Service

Figure 3-115 Test (Check) Failed

If Retrieve is Failing ...

If Retrieve is failing but Query is functioning, verify if the scanner has been registered as an receiver on the server.

Section 3-11
Connectivity Setup - Software v2.x

NOTE: FMI 76037 updates software versions v2.3.0 and below to Software version v2.3.1.

NOTE: If connected as a stand-alone network, only scanner, EchoPAC PC Workstation and an optional network printer in a separate network, you should use default delivery settings.

3-11-1 Introduction

To be able to use the network functions when connected to a hospital network, the scanner must have a proper network address.

- Before you can set up the scanner, you need to collect some information. The "Pre-quote Worksheet for DICOM Network Information" on page 2-14 can be used for gathering this information. Typical source for this information is the network administrator.
- Follow the steps below to prepare the scanner for use on the network.

3-11-2 Contents in this Section

- 3-11-3 "Compatibility" on page 3-109
- 3-11-4 "Select TCP/IP Set-up Screen - Software v2.x" on page 3-110
- 3-11-5 "Set the Scanner’s Network Information - Software Version v2.x" on page 3-112
- 3-11-6 "Set the Remote Archive’s Network Information - Software v2.x" on page 3-113
- 3-11-7 "Save the New Settings - Software v2.x" on page 3-113
- 3-11-8 "Verification of a Connection Set Up to EchoPAC PC - Software v2.x" on page 3-114
- 3-11-9 "HL7 Communication Setup for Software v2.x" on page 3-122
- 3-11-10 "Set Up Connection to a DICOM Server in a Network - Software v2.x" on page 3-126

3-11-3 Compatibility

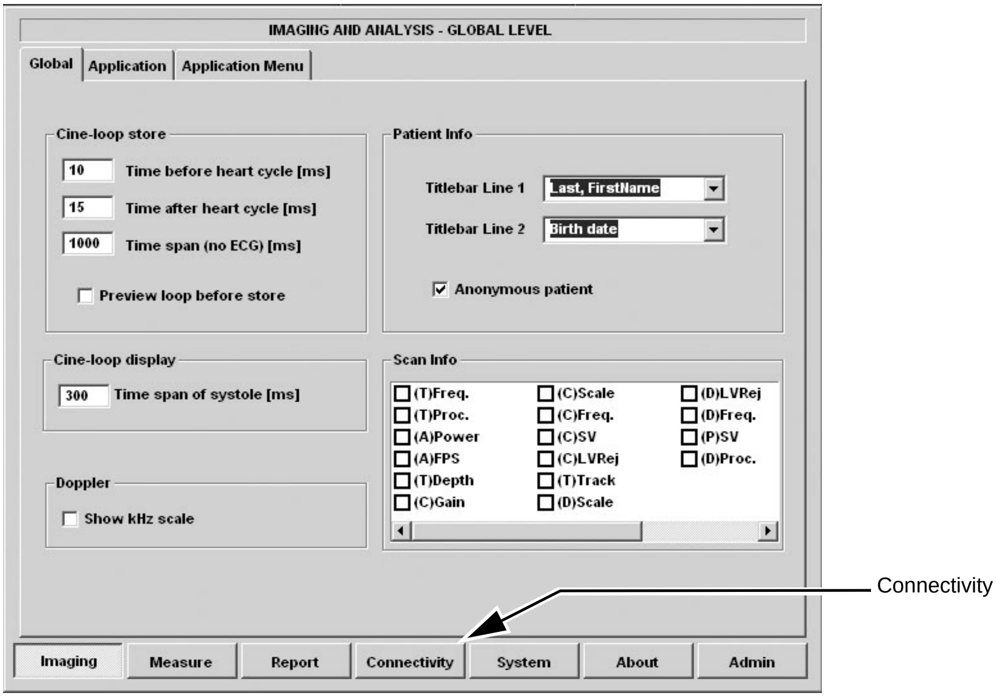
3-11-3-1 Vivid 7 with Software Version v2.4.x

Vivid 7 with Software Version v2.4.x (System Software v1.5.1) can communicate with:

- EchoPAC PC with software version v2.4.x
- EchoPAC PC with software version v3.x
- EchoPAC PC with software version v4.x
- EchoPAC PC with software version v5.x
- EchoPAC PC with software version v6.x
- EchoPAC PC with software version v7.x
- Image Vault 3
- Image Vault 4
- EchoServer 7

3-11-4 Select TCP/IP Set-up Screen - Software v2.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.



IMAGING AND ANALYSIS - GLOBAL LEVEL

Cine-loop store
10 Time before heart cycle [ms]
15 Time after heart cycle [ms]
1000 Time span (no ECG) [ms]
☐ Preview loop before store

Patient Info
Titlebar Line 1: Last, FirstName
Titlebar Line 2: Birth date
☑ Anonymous patient

Cine-loop display
300 Time span of systole [ms]

Scan Info
☐ (T)Freq.
☐ (T)Proc.
☐ (A)Power
☐ (A)FPS
☐ (T)Depth
☐ (C)Gain
☐ (C)Scale
☐ (C)Freq.
☐ (C)SV
☐ (C)LVRej
☐ (T)Track
☐ (D)Scale
☐ (D)LVRej
☐ (D)Freq.
☐ (P)SV
☐ (D)Proc.

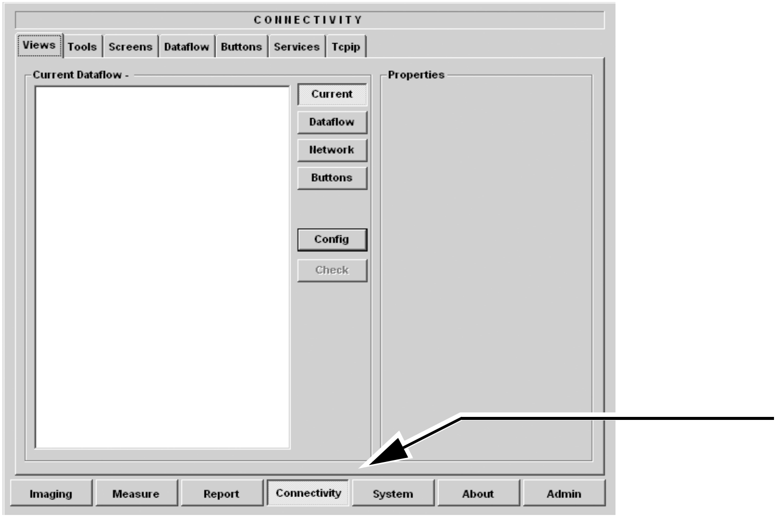
Doppler
☐ Show kHz scale

Global
Application
Application Menu
Imaging
Measure
Report
Connectivity
System
About
Admin
Connectivity

Figure 3-116 Measuring and Analyzes - Global Level

3-11-4 Select TCP/IP Set-up Screen - Software v2.x (cont'd)

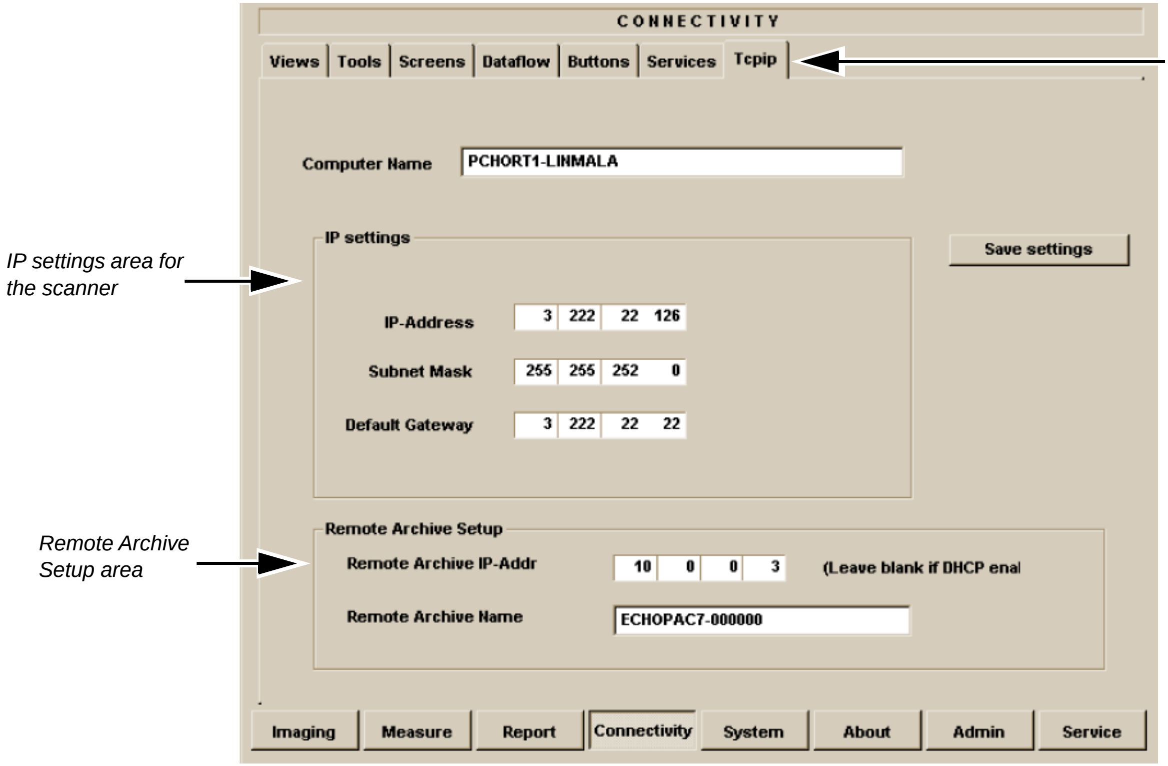
2.) Select CONNECTIVITY (in the lower part of the window).


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Current Dataflow -
Properties
Current
Dataflow
Network
Buttons
Config
Check
Imaging
Measure
Report
Connectivity
System
About
Admin

Connectivity

Figure 3-117 Connectivity Opening Screen

3.) Select the TCP/IP TAB (it is named Tcpip). (See example in Figure 3-118.)


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
IP settings
Save settings
Remote Archive Setup
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name: PCHORT1-LINMALA

IP-Address: 3 222 22 126

Subnet Mask: 255 255 252 0

Default Gateway: 3 222 22 22

Remote Archive IP-Addr: 10 0 0 3 (Leave blank if DHCP enal

Remote Archive Name: ECHOPAC7-000000

TCP/IP Tab

IP settings area for the scanner

Remote Archive Setup area

Figure 3-118 TCP/IP Set-up Screen, Overview

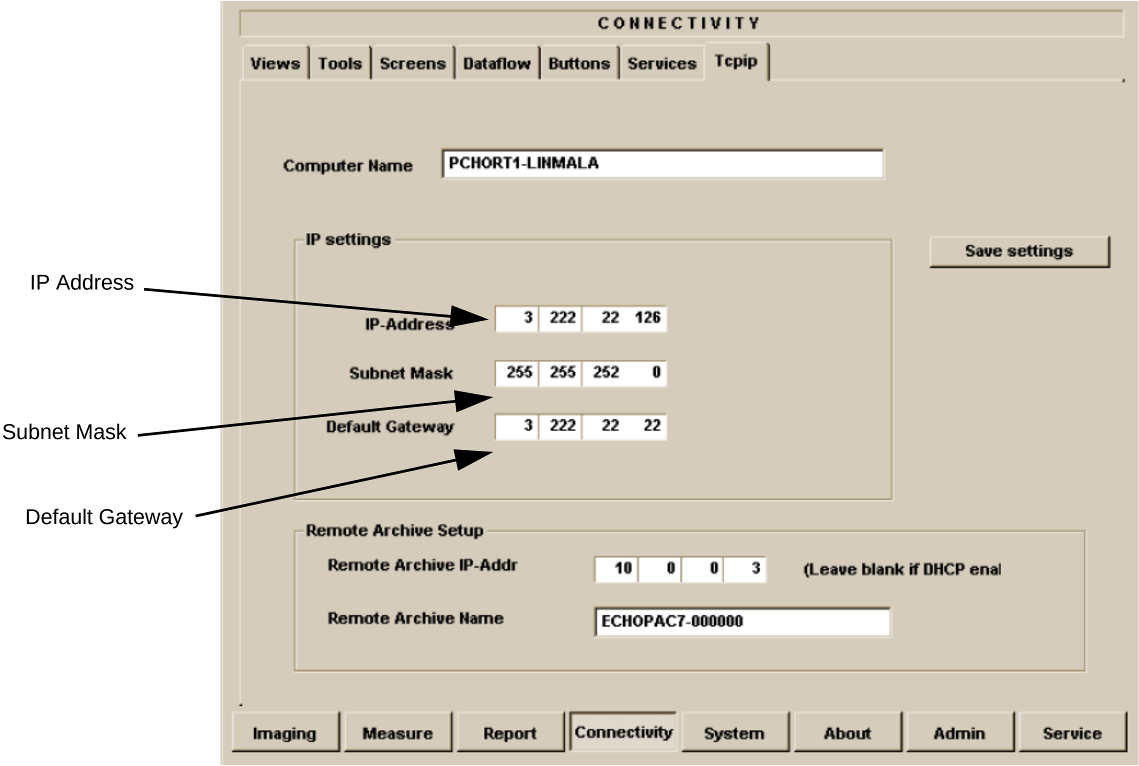
3-11-5 Set the Scanner’s Network Information - Software Version v2.x

In the IP settings area of the screen, enter the;

- IP Address for scanner. (Default IP Address from factory: 10.0.0.3).
- Subnet Mask for scanner. (Default Subnet Mask from factory: 255.255.255).
- IP address for Default Gateway. (Default Subnet Mask from factory: 0.0.0.0).

NOTE: For software v2.x, the Port Number has been set to 104. It can not be adjusted.

.


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
IP settings
Save settings
Remote Archive Setup
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
IP Address
Subnet Mask
Default Gateway

Computer Name: PCHORT1-LINMALA

IP-Address: 3 222 22 126

Subnet Mask: 255 255 252 0

Default Gateway: 3 222 22 22

Remote Archive IP-Addr: 10 0 0 3 (Leave blank if DHCP enal

Remote Archive Name: ECHOPAC7-000000

Figure 3-119 TCP/IP Set-up for Vivid 7

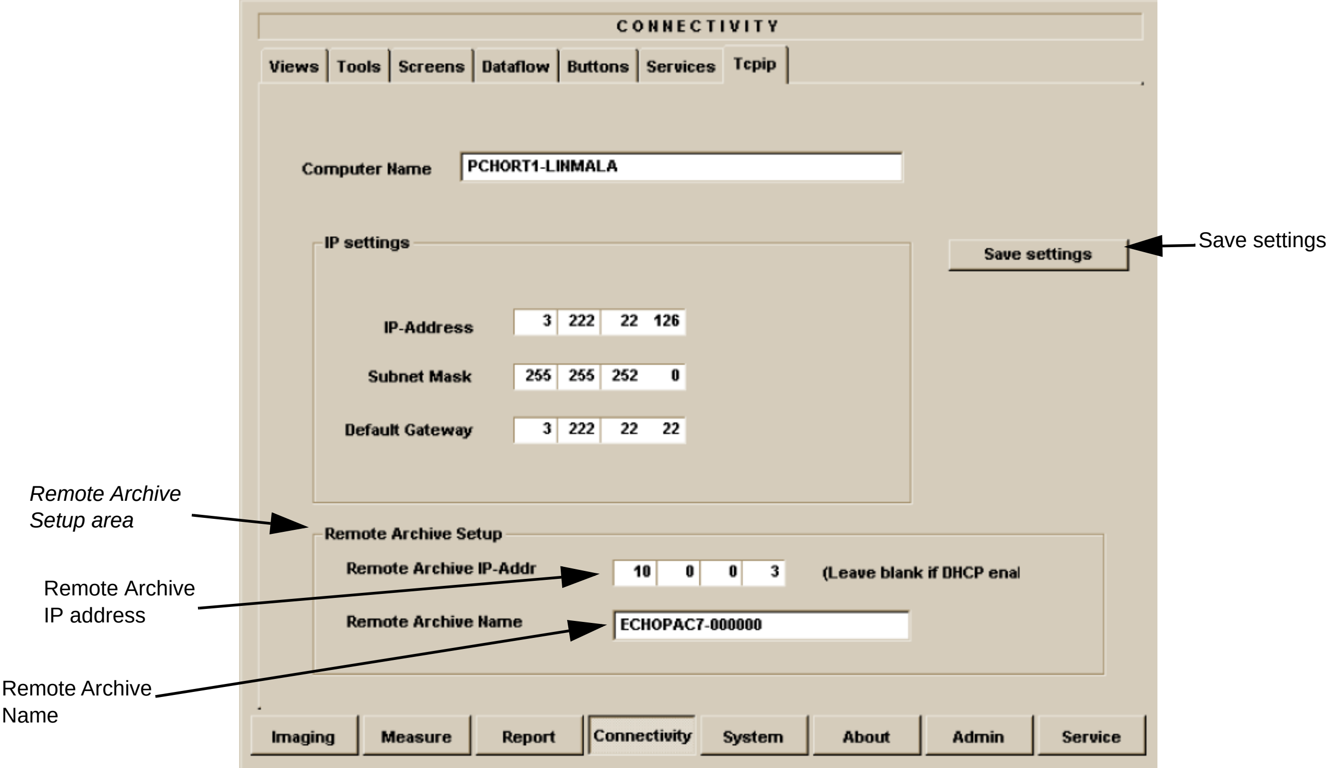
3-11-6 Set the Remote Archive's Network Information - Software v2.x

In the Remote Archive Setup area of the screen (see example in Figure 3-118.), enter the;

1.) Remote Archive IP address. (Default IP Address from factory: 10.0.0.4).

2.) Remote Archive Name. (Default Remote Archive Name from factory: ECHOPAC7-000001).

.



CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
IP settings
Save settings
Remote Archive Setup
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name: PCHORT1-LINMALA

IP-Address: 3 222 22 126

Subnet Mask: 255 255 252 0

Default Gateway: 3 222 22 22

Remote Archive IP-Addr: 10 0 0 3 (Leave blank if DHCP enal

Remote Archive Name: ECHOPAC7-000000

Save settings

Remote Archive Setup area

Remote Archive IP address

Remote Archive Name

Figure 3-120 TCP/IP Set-up for Remote Archive (EchoPAC PC)

3-11-7 Save the New Settings - Software v2.x

1.) Press **SAVE SETTINGS** to save the new settings.

The new settings are saved to a common settings file. After a restart, the settings are also included in other screens.

2.) Restart Vivid 7 to make the changes take place.

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) Select **CONNECTIVITY** (in the lower part of the window).
3.) Select the **VIEWS** tab, located in upper part of window, to display the Current Dataflow Views screen, see Figure 3-121.

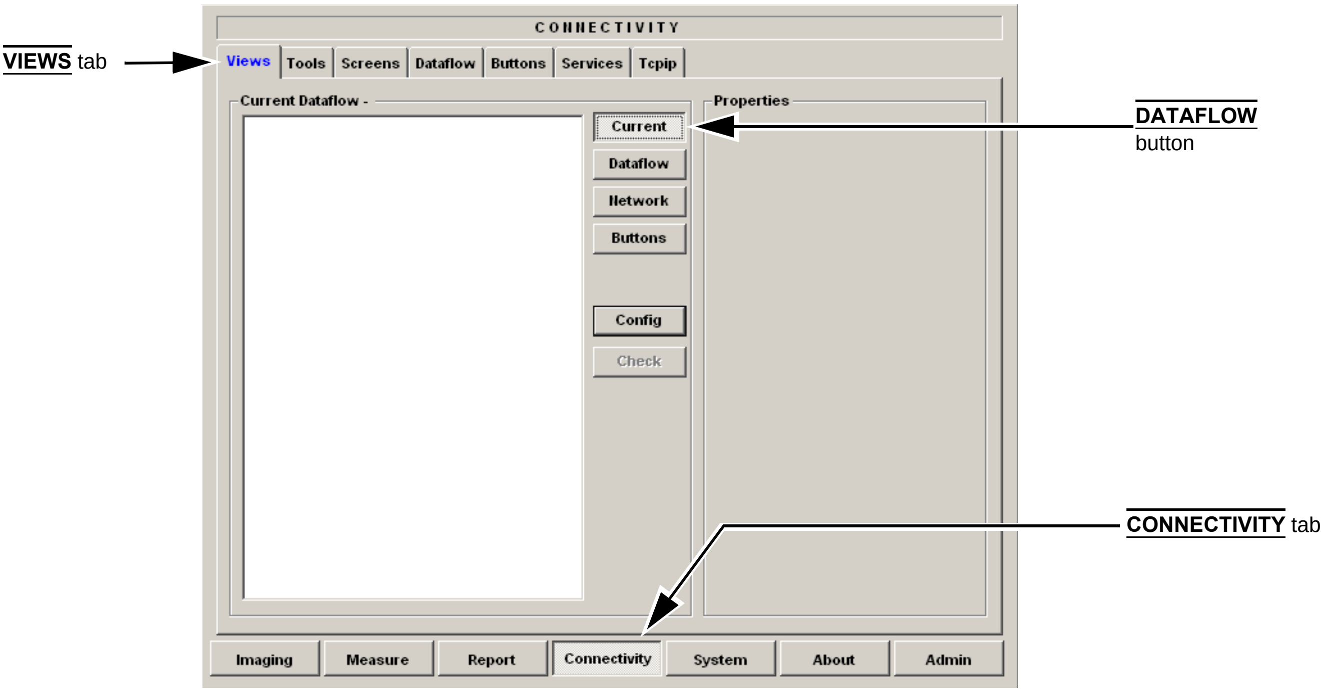

VIEWS tab
DATAFLOW button
CONNECTIVITY tab
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Current Dataflow -
Properties
Current
Dataflow
Network
Buttons
Config
Check
Imaging
Measure
Report
Connectivity
System
About
Admin

Figure 3-121 Current Dataflow Views screen

4.) Select the **DATAFLOW** button to see all available data flows, see Figure 3-122.
5.) Select the **+** beside the dataflow you want to check (here: *Remote Archive - Remote HD*) to see its contents.

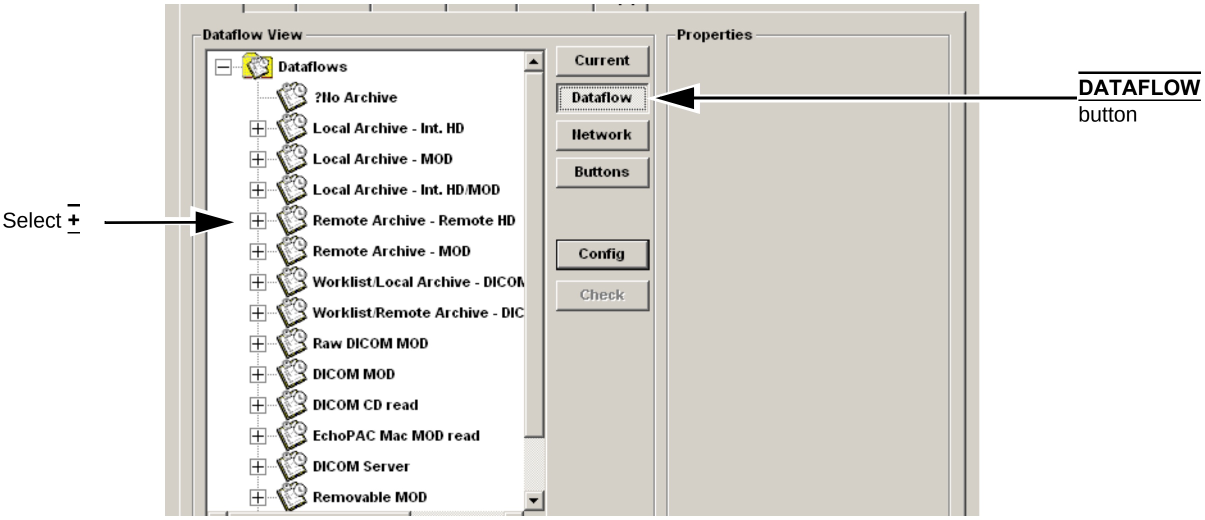
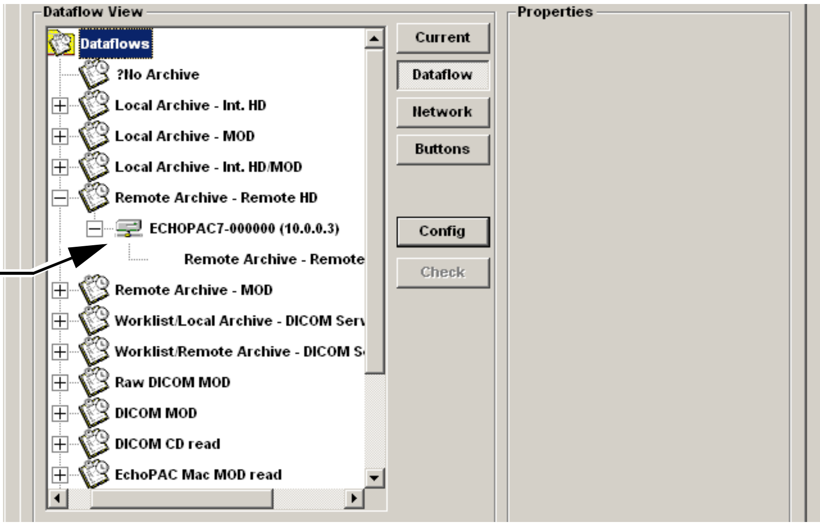

DATAFLOW button
Select +
Dataflow View
Properties
Dataflows
?No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM
Worklist/Remote Archive - DIC
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable MOD
Current
Dataflow
Network
Buttons
Config
Check

Figure 3-122 Pre-configured Data flows in Vivid 7

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)


Dataflow View
Properties
Dataflows
?No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
ECHOPAC7-000000 (10.0.0.3)
Remote Archive - Remote
Remote Archive - MOD
Worklist/Local Archive - DICOM Serv
Worklist/Remote Archive - DICOM S
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
Current
Dataflow
Network
Buttons
Config
Check

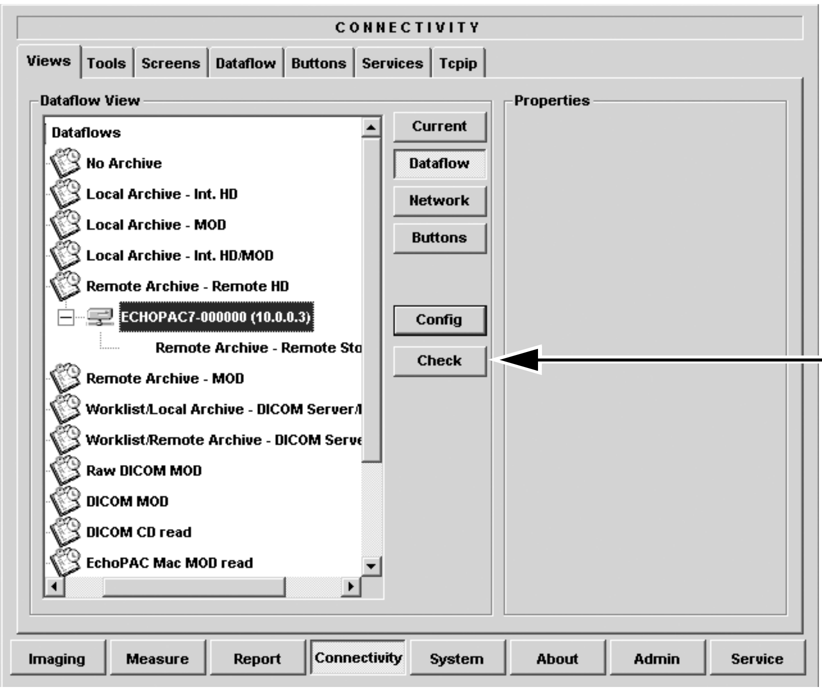
Select (highlight) the server's name

Figure 3-123 Remote HD dataflow contents

The Remote Archive - Remote HD includes an EchoPAC PC with one Service also called *Remote Archive - Remote HD*. The name of this service indicates that the archive is located on a hard disk on a remote server (EchoPAC PC is used as an server).

6.) Select the EchoPAC PC's name to highlight it, see Figure 3-123.

7.) Select **CHECK**, see Figure 3-124, to verify if there is a connection between the ultrasound unit and the EchoPAC PC Workstation.


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow View
Properties
Dataflows
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
ECHOPAC7-000000 (10.0.0.3)
Remote Archive - Remote Sto
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/I
Worklist/Remote Archive - DICOM Serve
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
Current
Dataflow
Network
Buttons
Config
Check
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Select **CHECK**

Figure 3-124 Verify dataflow connection

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)

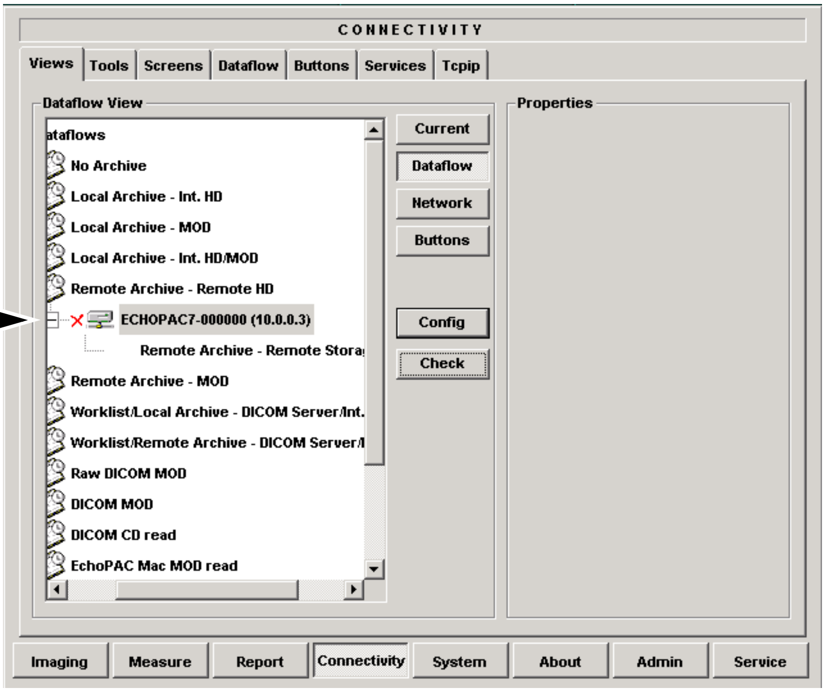

CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow View
ataflows
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
ECHOPAC7-000000 (10.0.0.3)
Remote Archive - Remote Stora
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int.
Worklist/Remote Archive - DICOM Server/I
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
Current
Dataflow
Network
Buttons
Config
Check
Properties
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
Red "X"

Figure 3-125 Verification of connection failed

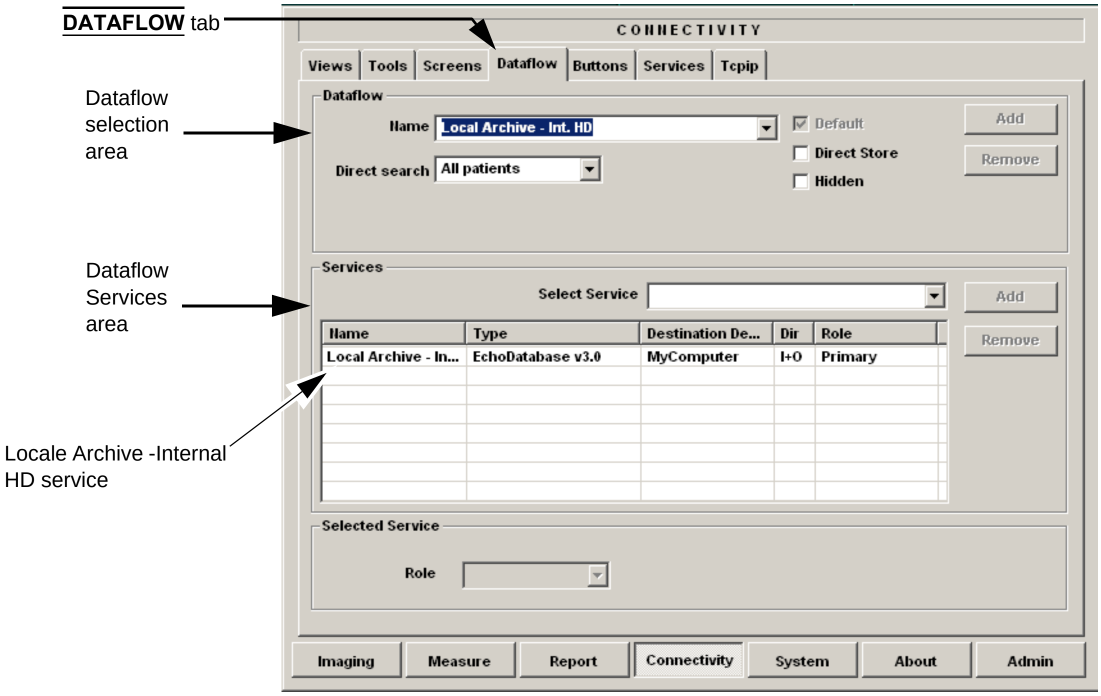
- In the example in Figure 3-125, the red "X" next to the computer sign (×), means that the check failed. The cause may be;
    - the setup of the network information, either on Vivid 7 or on the EchoPAC PC, or
    - the network connection is broken somewhere between the Vivid 7 and the EchoPAC PC.

*NOTE: If the Check button fails directly, the AE Title is probably wrong.
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.*

- A green light next to the computer sign means that a network connection is in place.

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)

8.) Select the **DATAFLOW** tab to view the Dataflow Services window.


DATAFLOW tab
Dataflow selection area
Dataflow Services area
Locale Archive -Internal HD service
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow
Default
Direct Store
Hidden
Add
Remove
Services
Select Service
Add
Remove
Selected Service
Role
Imaging
Measure
Report
Connectivity
System
About
Admin

Name: Local Archive - Int. HD

Direct search: All patients

☑ Default
☐ Direct Store
☐ Hidden

Name	Type	Destination De...	Dir	Role
Local Archive - In...	EchoDatabase v3.0	MyComputer	I+O	Primary

Figure 3-126 Dataflow Services Window

9.) Select *Remote Archive - Remote HD* on the drop-down menu to see the contents of that dataflow.

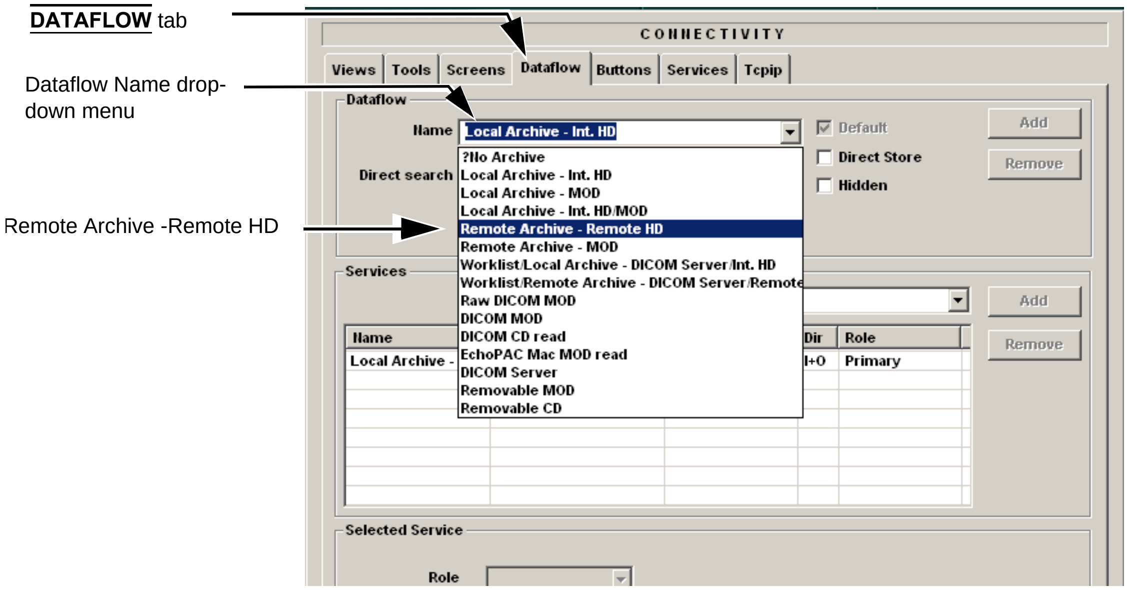
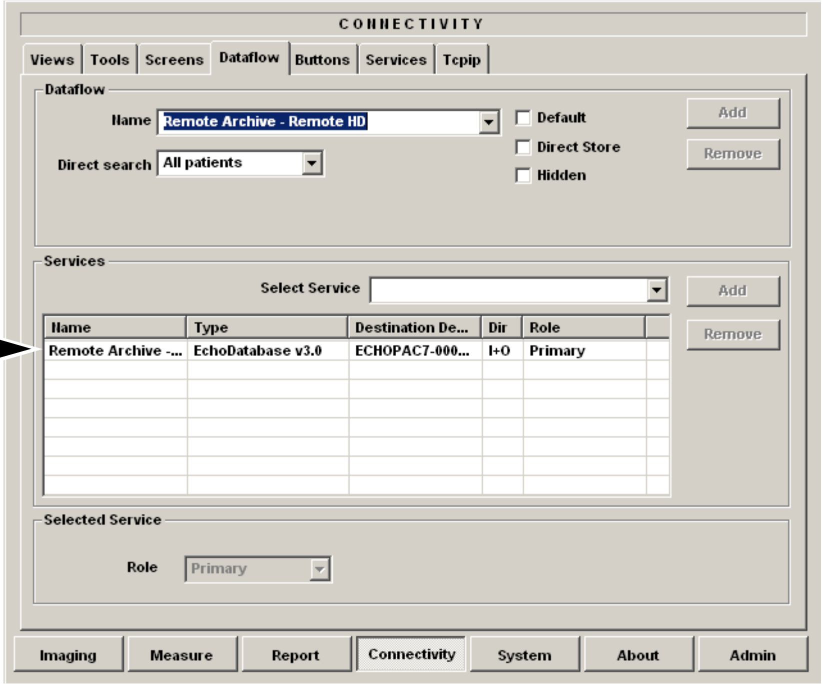

DATAFLOW tab
Dataflow Name drop-down menu
Remote Archive -Remote HD
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow
Name
Local Archive - Int. HD
?No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable MOD
Removable CD
Direct search
Default
Direct Store
Hidden
Add
Remove
Services
Add
Remove
Name
Dir
Role
Local Archive -
I+O
Primary
Selected Service
Role

Figure 3-127 Obtaining Dataflow Contents Overview

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Add
Remove
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin

Dataflow

Name: Remote Archive - Remote HD

Direct search: All patients

☐ Default
☐ Direct Store
☐ Hidden

Services

Select Service:

Name	Type	Destination De...	Dir	Role
Remote Archive -...	EchoDatabase v3.0	ECHOPAC7-000...	I+O	Primary

Selected Service

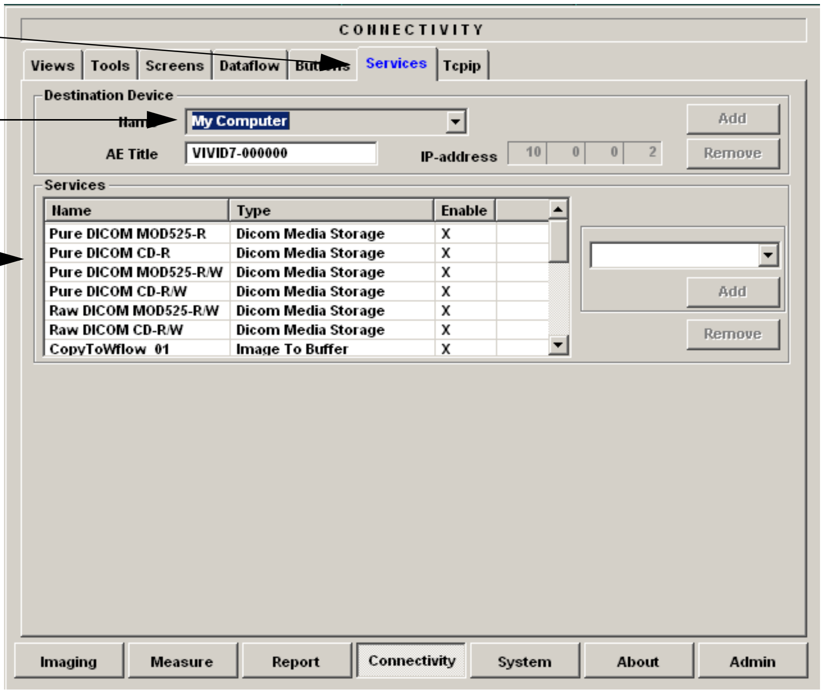
Role: Primary

Remote Archive -
Remote HD

Figure 3-128 Remote Archive - Remote HD Dataflow Contents Overview

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)

10.) Select the **SERVICES** tab (located near the top of the window).



CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Destination Device
Add
Remove
Services
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin

Name: My Computer

AE Title: VIVID7-000000

IP-address: 10 0 0 2

Name	Type	Enable
Pure DICOM MOD525-R	Dicom Media Storage	X
Pure DICOM CD-R	Dicom Media Storage	X
Pure DICOM MOD525-R/W	Dicom Media Storage	X
Pure DICOM CD-R/W	Dicom Media Storage	X
Raw DICOM MOD525-R/W	Dicom Media Storage	X
Raw DICOM CD-R/W	Dicom Media Storage	X
CopyToWflow 01	Image To Buffer	X

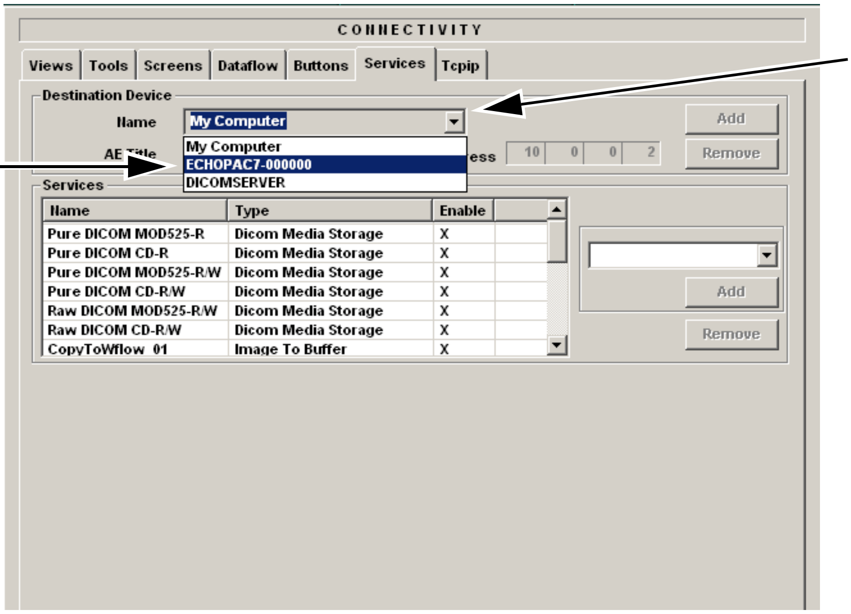
SERVICES tab

Name drop-down menu

Local Archive - Local Storage

Figure 3-129 Dataflow Services

11.) Select the EchoPAC PC Workstation you want to connect to, from the "Name" drop-down menu. In this example, it is called "EchoPAC7-000000".



CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Destination Device
Add
Remove
Services
Add
Remove

Name: My Computer

My Computer
ECHOPAC7-000000
DICOMSERVER

AE Title

IP-address: 10 0 0 2

Name	Type	Enable
Pure DICOM MOD525-R	Dicom Media Storage	X
Pure DICOM CD-R	Dicom Media Storage	X
Pure DICOM MOD525-R/W	Dicom Media Storage	X
Pure DICOM CD-R/W	Dicom Media Storage	X
Raw DICOM MOD525-R/W	Dicom Media Storage	X
Raw DICOM CD-R/W	Dicom Media Storage	X
CopyToWflow 01	Image To Buffer	X

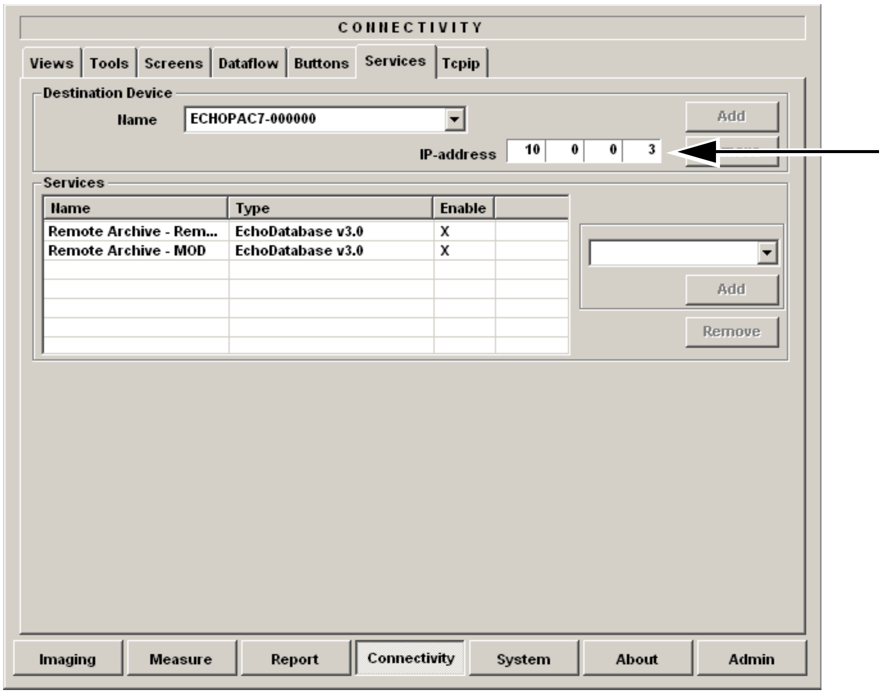
Name drop-down menu

Select Server

Figure 3-130 Dataflow Services, Choices and Setup

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)

12.) Verify that the IP-address is correct, indicating that you have selected the right unit.
If the IP number is wrong, it means that you are addressing the wrong device (computer).
Correct the address and do a new verification before you continue.


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Add
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin

Destination Device

Name ECHOPAC7-000000

IP-address 10 0 0 3

Services

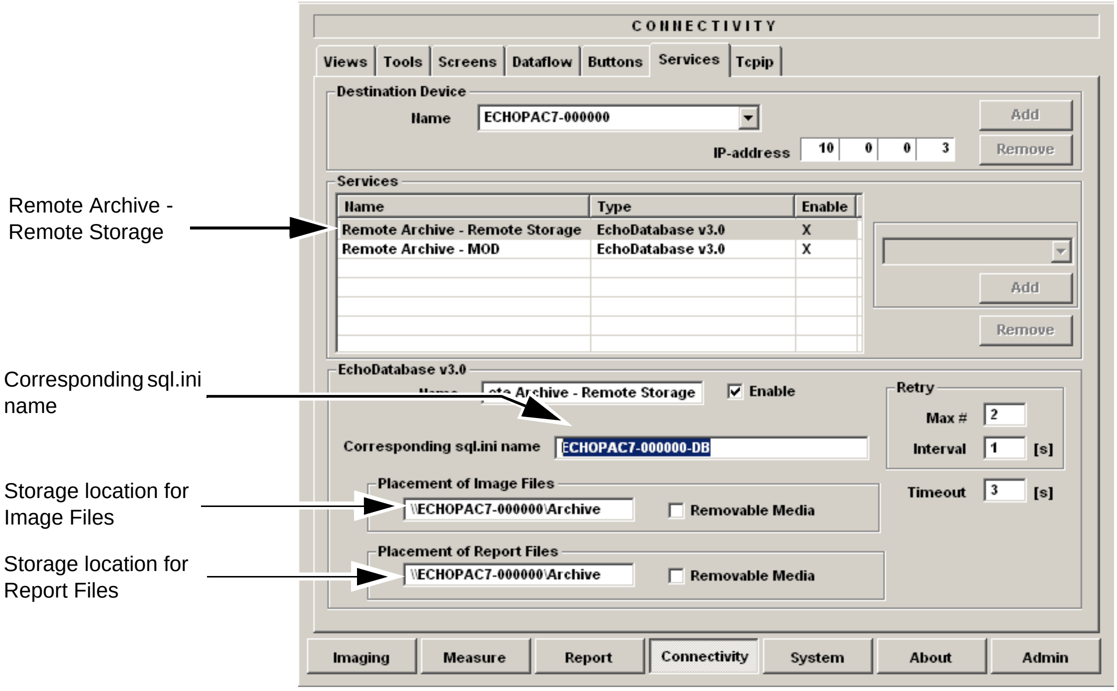
Name	Type	Enable	
Remote Archive - Rem...	EchoDatabase v3.0	X	
Remote Archive - MOD	EchoDatabase v3.0	X	

IP address for selected device

Figure 3-131 Verify/change IP address to selected device.

3-11-8 Verification of a Connection Set Up to EchoPAC PC - Software v2.x (cont'd)

13.) In the list of "Services", select "Remote Archive - Remote Storage".


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Add
Remove
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin
Remote Archive - Remote Storage
Corresponding sql.ini name
Storage location for Image Files
Storage location for Report Files

Destination Device

Name: ECHOPAC7-000000

IP-address: 10 0 0 3

Services

Name	Type	Enable
Remote Archive - Remote Storage	EchoDatabase v3.0	X
Remote Archive - MOD	EchoDatabase v3.0	X

EchoDatabase v3.0

Name: ote Archive - Remote Storage ☑ Enable

Corresponding sql.ini name: ECHOPAC7-000000-DB

Placement of Image Files: \\ECHOPAC7-000000\Archive ☐ Removable Media

Placement of Report Files: \\ECHOPAC7-000000\Archive ☐ Removable Media

Retry

Max #: 2

Interval: 1 [s]

Timeout: 3 [s]

Figure 3-132 Dataflow services Choice and Setup

14.) In the list of *Services* select *Remote Archive - Remote Storage*.

15.) Change the *Corresponding sql.ini name* to reflect the name of the ECHOPAC7-nnnnnn Workstation. The *Corresponding sql.ini name* is a combination of the host name plus a space and the two letters "DB".

Example: If the EchoPAC PC name is *ECHOPAC7-987654*, the *Corresponding sql.ini name* will be *ECHOPAC7-987654 DB.*

16.) Change the *Placement of Image Files* and *Placement of Report Files* names so they reflect the name of the EchoPAC PC Workstation.

Example: If the EchoPAC PC name is *ECHOPAC7-987654*, the *Placement of Image Files* and *Placement of Report Files* are both *ECHOPAC7-987654\Archive.*

This completes the EchoPAC PC connection setup.

NOTE: *Remember that these settings have no effect until you have logged on to the dataflow.*
It may be necessary to log on and log off this dataflow before the settings work.

3-11-9 HL7 Communication Setup for Software v2.x

3-11-9-1 Introduction

The procedures below tell you how to set up the Vivid 7 workstation so it can connect to the Hospital Information System (HIS), via the Vivid HL7 Gateway. By connecting to the HIS, demographic information i.e Patient ID, Name, Gender etc. can be pulled from the HIS, reducing “double-work” and typing errors. Patient Reports can be sent back to the HIS for storage together with the rest of the Patient Records.

3-11-9-2 Preparations

1.) Before you can set up the HL 7 Communication, you need to collect some information.
    - The IP address for the Vivid HL7 Gateway
    - Port Number used by the Vivid HL7 Gateway (Default port: 3320)

    Typical source for this information is the Mitra support personnel.

    Figure 2-2 "Pre-quote Worksheet for DICOM Network Information" on page 2-14 can be used for gathering this information.

2.) Provide the computer name of each EchoPAC PC Workstation and Vivid 7 being configured to the Mitra support personnel.

3-11-9-3 Configuration of Modality Worklist Services

Identify Dataflow to be Used

1.) Identify which dataflow is to be used at the site. If they will be using DICOM Modality Worklist, then the dataflow must include a Worklist service.
2.) On the Connectivity screen, select the Dataflow tab.
3.) Select the name of the site's dataflow from the pull-down.
4.) In the Services section, locate the Worklist service.
5.) Record the service's name and destination device.

Configure the DICOM Worklist Service

1.) Select the Services tab.
2.) Select the Worklist destination device from the pull down menu.
3.) Enter the IP address for the Vivid HL7 Gateway.
4.) Enter a descriptive name in the Name field. Example: Vivid HL7 Gateway. The use of this field is optional).
5.) Enter AE Title. Use the Computer Name for the unit you are configuring.
6.) Enter Port Number. Port 3320 is default, but Mitra may have provided another port number.
7.) Set Time-out to 90.
8.) Leave the rest of the fields unchanged.

3-11-9-3 Configuration of Modality Worklist Services (cont'd)

Configure the Search Criterias

NOTE: This configuration is required.

1.) Select the Search Criterias button.
2.) Select the criteria Modality and select the Remove button.
3.) Press the OK button.

Configure Search Criterias: Constrain Query by AE Title

NOTE: This configuration is optional. It should only be performed if the site is directing orders to the Vivid 7 that is scheduled to perform the study.

Please contact the Mitra support personnel to verify that this step is needed.

1.) In the Search Criterias dialog box, select 00400001 Scheduled Station AE Title from the Select Tag pull down menu.
2.) Enter the Vivid 7 computer name for the Value.
3.) Press the Add to List button.
4.) Press the OK button.

Configure Search Criterias: Constrain Query by MRN

NOTE: This configuration should be performed if the site will need to constrain the Worklist queries by MRN (patient id)

1.) In the Search Criterias dialog box, select 00101000 Other Patient IDs from the Select Tag pull down menu.
2.) Enter a 9 digit number for the Value.
3.) Select the Add to List button.
4.) Select the OK button.

Assign Dicom Worklist name to Dataflow

1.) Select the Dataflow tab.
2.) From the Dataflow name pull down menu, select the Dataflow which will be used.
3.) Remove the Dicom Worklist service currently used in the Dataflow.
4.) From the Select Service pull down menu, select the Gateway Modality Worklist service.
5.) Select the Add button.
6.) Ensure that the service is displaying the value In for the Dir parameter and that its role is Primary.

3-11-9-3 Configuration of Modality Worklist Services (cont'd)

Test Connectivity with the Vivid HL7 Gateway

The purpose of this test is to verify that the Vivid 7 has connectivity with the Vivid HL7 Gateway.

1.) From either the Current or Dataflow view, expand the Dataflow incorporating the Gateway Modality Worklist service.
2.) Expand the Gateway destination device.
3.) Select the Gateway Modality Worklist service.
4.) Select the Check button.
    - If connectivity was achieved, then there should be a green check next to the name of the Gateway's Modality Worklist service.
    - If connectivity was not achieved, then there will be a red X next to the name of the Gateway's Modality Worklist service.

NOTE: If the Check button fails directly, the AE Title is probably wrong.
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

Troubleshoot Connectivity with the Gateway

Typical causes if connection between Vivid 7 and HIS failed:

1.) No network connection.
2.) IP address and/or port number was incorrectly entered when configuring the Gateway Modality Worklist service.
3.) Mitra support personnel have not configured the Gateway yet to accept Modality Worklist queries from the Vivid 7.
4.) Verify that the Vivid 7 computer name matches the value specified for the Gateway Modality Worklist service and that it also matches the value supplied to the Mitra support personnel.

Configure the Export to HL7 Path

1.) Enter the configuration screen for the EchoPAC PC.
2.) Press the Connectivity button.
3.) Select the Tools tab.
4.) In the section labeled Export Paths, make the following changes:
    a.) For the Export To HL7 path, enter the following information:
    \\ < Name or IP Address of the Vivid HL7 Gateway>\POLL_DIR

Example: \\Gateway\POLL_DIR

    b.) Verify that Text is select for the Export file format.

3-11-9-3 Configuration of Modality Worklist Services (cont'd)

Test Connectivity with the Vivid HL7 Gateway

1.) Start a new study and acquire an image, or use an existing study.
2.) In the Measurements mode, make some of the measurements.
3.) In the Report screen, create and store a report.
4.) In the Patient screen, select the study that you created the report in from the Examination List.
5.) From the More pull down menu, select HL7 Results.
6.) If the export was successful, then you should get the message:
Export exam status: OK.
7.) If the export was not successful, then you should get the message,
Export exam status: Unable to copy file or something similar.

Troubleshoot Connectivity with the Vivid HL7 Gateway

Typical causes if Connectivity with the Vivid HL7 Gateway failed:

1.) Path provided in Export to HL7 export path was incorrect.
2.) Mitra support personnel did not create the user account for the Vivid 7.

NOTE: *Required setup on the remote share:*
User: E1c2h3o4C5l6i7e8n9t
Password: u1l3t5r7a

3.) The POLL_DIR directory on the Vivid HL7 Gateway was not shared or the permissions are incorrect. Verify with Mitra support personnel.
4.) Domain or other network issue.
5.) If Report files (ReportXXX.chm) are not exported to the Vivid HL7 Gateway, then the reports may not have been stored when they were created on the EchoPAC PC.

3-11-10 Set Up Connection to a DICOM Server in a Network - Software v2.x

No special service tools are required to do this set-up.

3-11-10-1 Preparations

Obtain the following information from the network administrator:

- DICOM server's IP address, subnet mask (and gateway, if required).
- Server's Port Number.
- Server's AE Title.
- IP address for the Vivid 7.

3-11-10-2 Establish Network Connection to Hospital's Network

Connect an Ethernet cable from the Vivid 7 to the wall network outlet.

3-11-10-3 Set up TCP/IP address on Vivid 7

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) Select **CONNECTIVITY**.
3.) Select **TCPIP** tab.
4.) Enter IP-Address, Subnet Mask (and gateway, if required).
5.) Select **SAVE SETTINGS**. You will be asked to reboot, but wait with that until later.

3-11-10-4 DICOM Server's Set Up

It may be necessary for the administrator to enter information about Vivid 7 into the DICOM server's set-up.

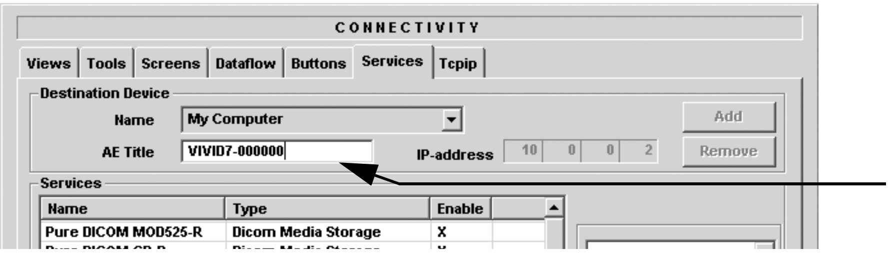
This information is typical Vivid 7's AE Title and maybe also the IP address which administrator provides.

(See 3-11-10-5 "Vivid 7's AE Title" on page 3-126 for a description on how to obtain Vivid 7's AE Title.)

3-11-10-5 Vivid 7's AE Title

1.) Select **CONNECTIVITY**.
2.) Select the **SERVICES** tab.

Vivid 7's AE Title is listed below My Computer (here it is VIVID7-000000).



Name: My Computer
AE Title: VIVID7-000000
IP-address: 10 0 0 2

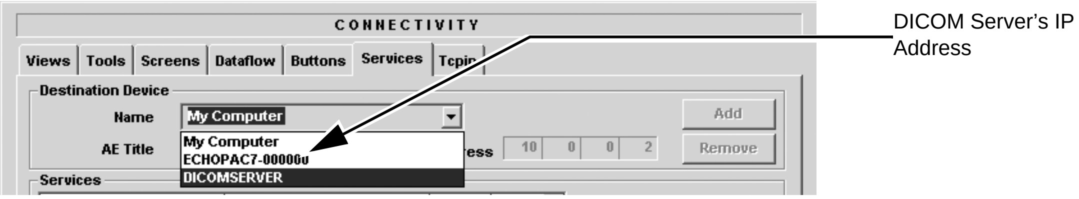
Name	Type	Enable
Pure DICOM MOD525-R	Dicom Media Storage	X

Vivid 7's AE Title

Figure 3-133 Vivid 7's AE Title

3-11-10-6 Set-up of DICOM Server in Vivid 7's Configuration Screens - Software v2.x

1.) From the Name pull-down menu select DICOMSERVER.

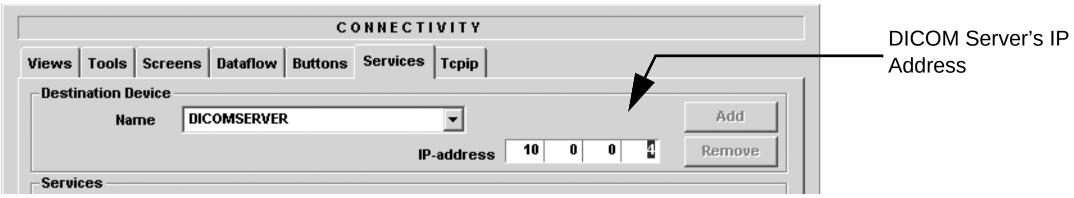

CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Destination Device
Services
Add
Remove

Name: My Computer
My Computer
ECHOPAC7-00000θ
DICOMSERVER
AE Title
…ess: 10 0 0 2

DICOM Server's IP Address

Figure 3-134 Select DICOM Server

2.) Enter the IP address of the DICOM server in the IP Address field.


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Destination Device
Services
Add
Remove

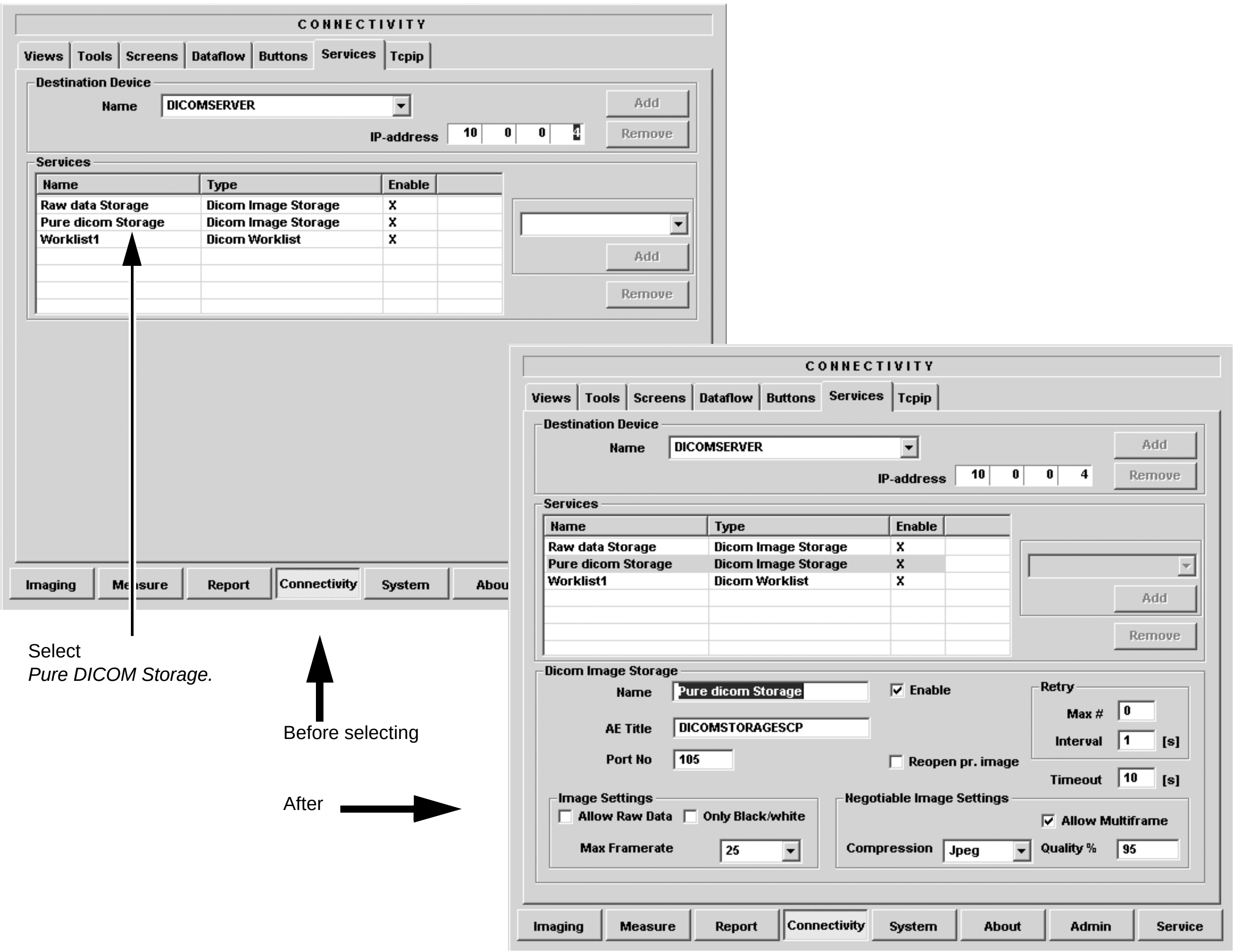
Name: DICOMSERVER
IP-address: 10 0 0 4

DICOM Server's IP Address

Figure 3-135 Set DICOM Server's IP Address

3.) Select the Pure DICOM Storage line under Services and the bottom part of the screen will be populated with set-up information for the DICOM server.

3-11-10-6 Set-up of DICOM Server in Vivid 7's Configuration Screens - Software v2.x (cont'd)


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Destination Device

Name: DICOMSERVER

IP-address: 10 0 0 4

Services

Name	Type	Enable
Raw data Storage	Dicom Image Storage	X
Pure dicom Storage	Dicom Image Storage	X
Worklist1	Dicom Worklist	X

Dicom Image Storage

Name: Pure dicom Storage

☑ Enable

AE Title: DICOMSTORAGESCP

Port No: 105

☐ Reopen pr. image

Retry

Max #: 0

Interval: 1 [s]

Timeout: 10 [s]

Image Settings

☐ Allow Raw Data ☐ Only Black/white

Max Framerate: 25

Negotiable Image Settings

☑ Allow Multiframe

Compression: Jpeg

Quality %: 95

Select
Pure DICOM Storage.

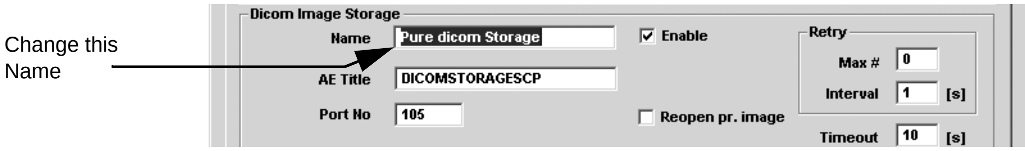
Before selecting

After

Figure 3-136 Select *Pure DICOM Storage*

3-11-10-6 Set-up of DICOM Server in Vivid 7's Configuration Screens - Software v2.x (cont'd)

4.) Change the Name to a name you pick for the DICOM server (e.g. ProSolv server). It doesn't really matter what this name is.

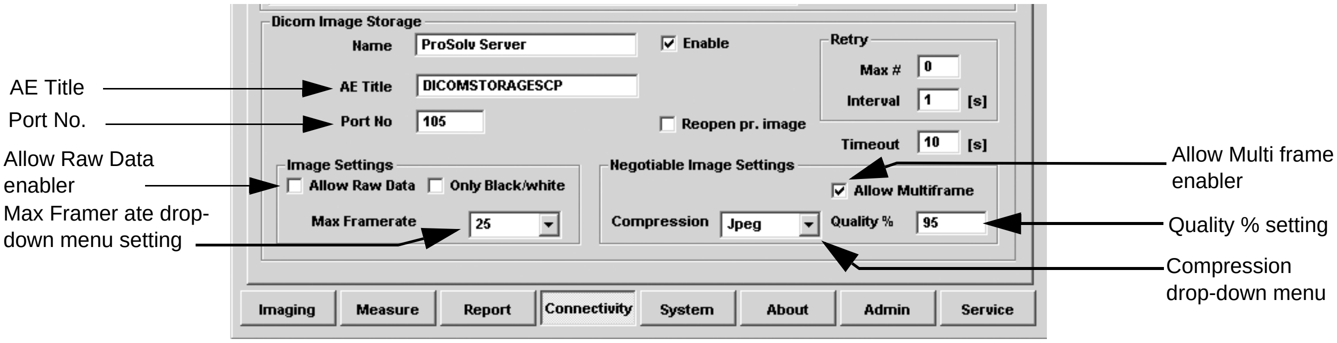


Change this Name

Dicom Image Storage
Name: Pure dicom Storage
AE Title: DICOMSTORAGESCP
Port No: 105
☑ Enable
☐ Reopen pr. image
Retry
Max #: 0
Interval: 1 [s]
Timeout: 10 [s]

Figure 3-137 Set DICOM Server's Name

5.) Change the AE Title to the name you got from the network administrator. This name must match exactly and is case sensitive.



AE Title

Port No.

Allow Raw Data enabler

Max Framer ate drop-down menu setting

Allow Multi frame enabler

Quality % setting

Compression drop-down menu

Dicom Image Storage
Name: ProSolv Server
AE Title: DICOMSTORAGESCP
Port No: 105
☑ Enable
☐ Reopen pr. image
Retry
Max #: 0
Interval: 1 [s]
Timeout: 10 [s]
Image Settings
☐ Allow Raw Data ☐ Only Black/white
Max Framerate: 25
Negotiable Image Settings
☑ Allow Multiframe
Compression: Jpeg
Quality %: 95

Figure 3-138 DICOM Server's Settings

6.) Change the port number to the number you got from the administrator.

7.) Don't touch the other settings, meaning they should be as follows:

Parameter	Setting	Comments
Allow raw data	Unchecked	
Max Framerate	25	You can go up to 30, but don't select full, as it may increase Image Store time
Only Black and White	Unchecked	
Compression	JPEG	
Allow multiframe	Checked	
Reopen per image	Unchecked	

Table 3-21 Default DICOM Setup in Vivid 7's Configuration Screen

8.) Press **F2** **(CONFIG)** on the alphanumeric keyboard to exit config. REBOOT the system.

3-11-10-7 Check the Connection to the DICOM Server (Ping) - Software v2.x

1.) After the system is rebooted, press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Enter the Connectivity screen.

3.) Select the **VIEWS** tab and the **DATAFLOW** button and you will see all available data flows.

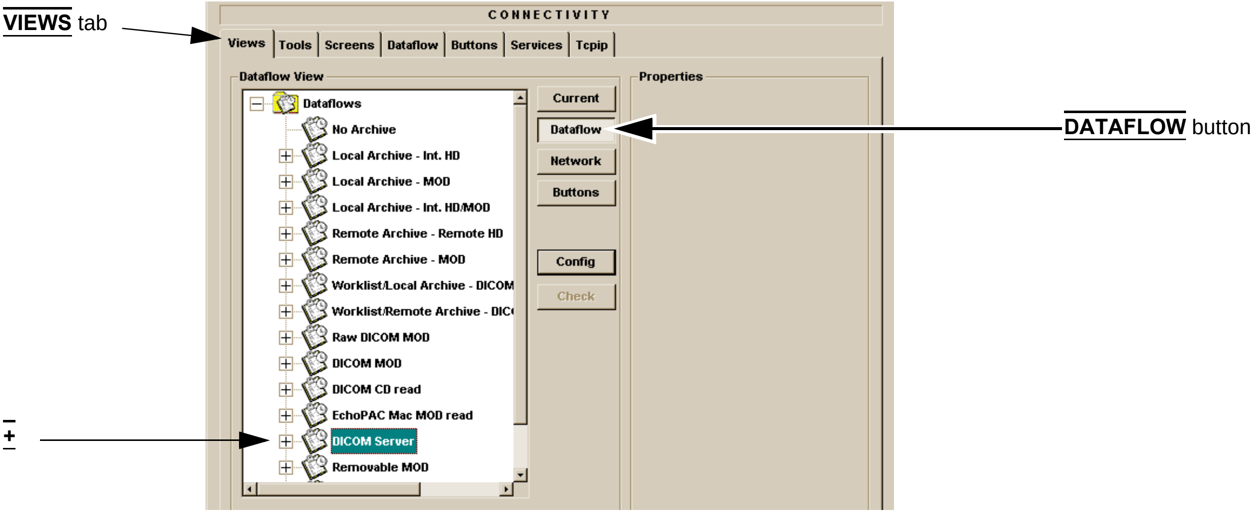

VIEWS tab
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow View
Properties
Dataflows
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM
Worklist/Remote Archive - DIC
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable MOD
Current
Dataflow
Network
Buttons
Config
Check
DATAFLOW button
+

Figure 3-139 All Data flows - Select "DICOM Server"

4.) Select the **+** by the "DICOM Server" dataflow to see the contents of that dataflow. This dataflow has one DICOM Server with Storage Service.
Two new lines will appear, DICOMSERVER and the name of the server (e.g. ProSolv server).

..

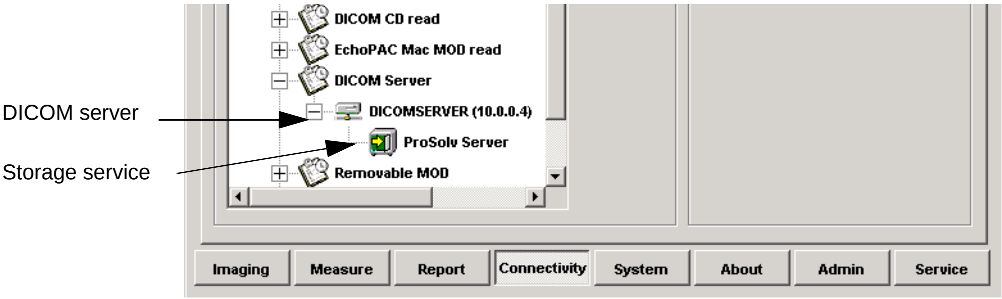

DICOM server
Storage service
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
DICOMSERVER (10.0.0.4)
ProSolv Server
Removable MOD
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Figure 3-140 Views and Dataflow Selections

5.) Select DICOMSERVER to highlight the line, then Select the Check button.
You should get a green check mark.
This is a hardware "ping" indicating that you have contact with the DICOM server's hardware. If you get a red cross, double check cabling and TCPIP addresses).

NOTE: *If the Check button fails directly, the AE Title is probably wrong.*
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

6.) Select the next line (e.g. ProSolv server) to highlight, then Select **CHECK**.
You should get a green check mark.
This is a DICOM "ping" indicating that you have contact with the DICOM server software. If you get a red cross, double check AE Title and port number).

3-11-10-8 Setting the DICOM Server as Default Dataflow - Software v2.x

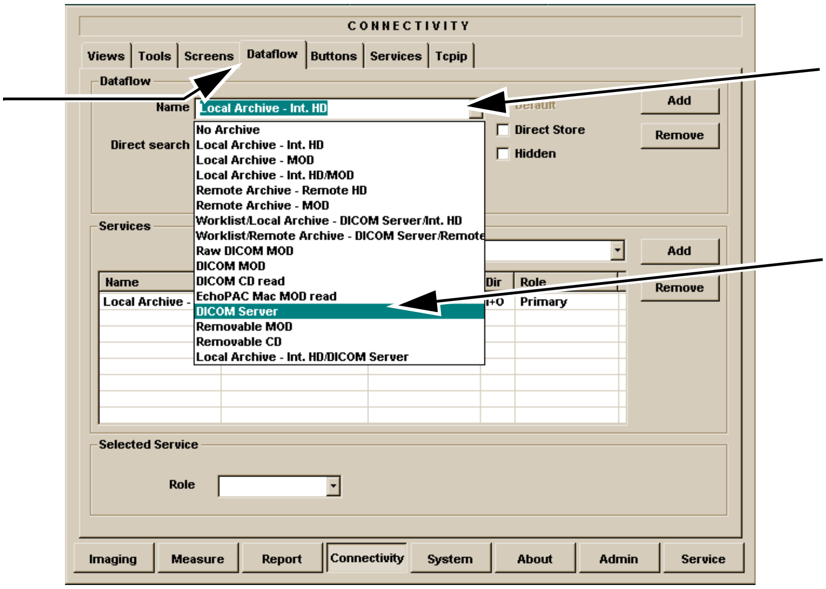
1.) Finish the verification in "Check the Connection to the DICOM Server (Ping) - Software v2.x" on page 3-130.
You need to have green check marks on both Hardware Ping and DICOM Ping before you continue.

1.) Select the **DATAFLOW** tab.

2.) Select “DICOM Server” dataflow on the “Dataflow Name” drop-down menu.

.

DATAFLOW tab


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow
Name
Local Archive - Int. HD
Direct search
Default
Direct Store
Hidden
Add
Remove
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server
Removable MOD
Removable CD
Local Archive - Int. HD/DICOM Server
Services
Name
Dir
Role
Local Archive -
Primary
Selected Service
Role
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

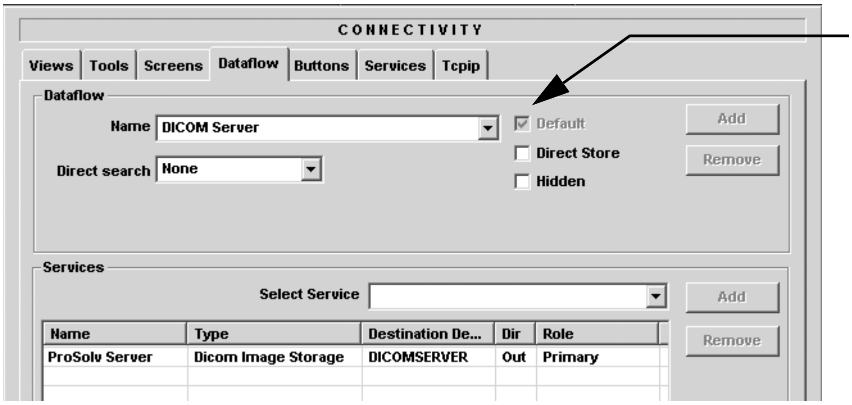
Dataflow Name drop-down menu

Select “DICOM Server”

Figure 3-141 Selecting DICOM Dataflow Services

3.) Check the Default box.

.


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow
Add
Remove
Services
Select Service
Add
Remove

Name: DICOM Server

Direct search: None

☑ Default
☐ Direct Store
☐ Hidden

Name	Type	Destination De...	Dir	Role
ProSolv Server	Dicom Image Storage	DICOMSERVER	Out	Primary

Select this check box to make DICOM the Default dataflow

Figure 3-142 Set DICOM as Default Dataflow

4.) Exit Config and restart the scanner (by hitting CTRL/ALT/R at the same time).

3-11-10-9 Performing a Study

1.) After restart, hit New Exam (you'll see that DICOM Server is the default dataflow), enter a last name and patient ID and start scanning and image acquisition. Images are stored in the local image buffer on the system.

2.) After having finished the study, Select New Exam and select All when asked if you want to save. The images will now be transferred to the server via a spooler.

3.) To view the status of the spooler job, press the **F4** key on the alphanumeric keyboard. You can select the Refresh button to get an update of the status of the spool job.

4.) Once the jobs are transferred, they will be deleted from the spooler.

3-11-10-10 Going Offline

1.) If you go offline with the scanner, you can still use the DICOM Server dataflow, and images will be saved into the spooler.

2.) Then, after connecting to the network, go into the spooler and press **RESEND**. All selected studies will then be sent to the server.

NOTE: If the Check button fails directly, the AE Title is probably wrong.
If the Check button fails after a long time (corresponding to the timeout), the IP address or Port Number is probably wrong.

Section 3-12
Ethernet Switch / Hub

An Ethernet Switch is used to connect Vivid 7 to an EchoPAC PC and a network printer in a Peer-to-Peer network. It can also be connected to the hospital’s network for access to a DICOM server.

The Ethernet Switch described here is included as an example. Both five port and eight port switches have been delivered with EchoPAC PC. Please read and follow the product documentation for the actual switch before installing/configuring.

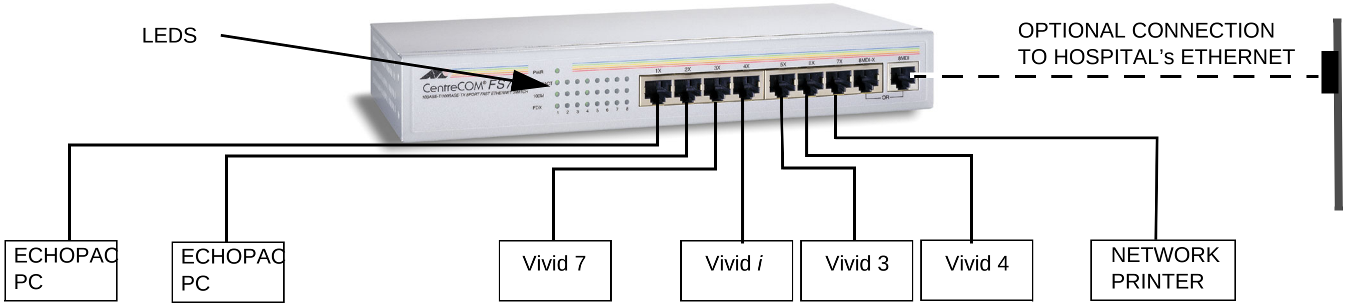

LEDS
OPTIONAL CONNECTION
TO HOSPITAL’s ETHERNET
ECHOPAC PC
ECHOPAC PC
Vivid 7
Vivid *i*
Vivid 3
Vivid 4
NETWORK PRINTER

Figure 3-143   Ethernet Switch Connections (8-port example)

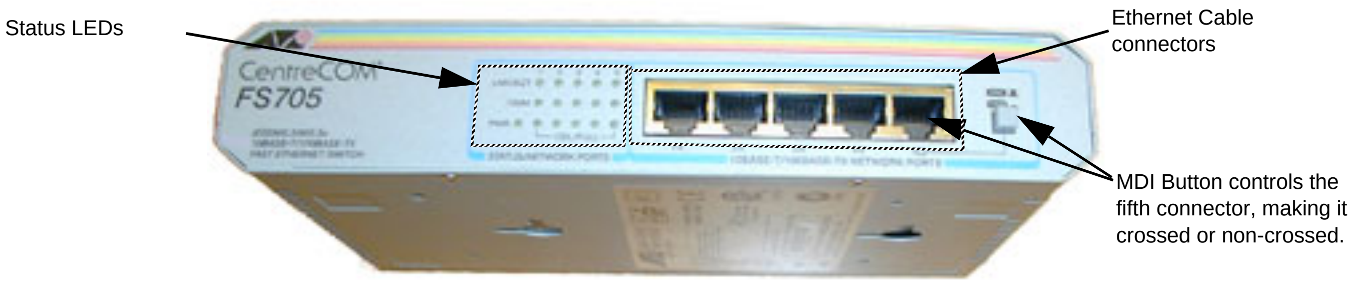
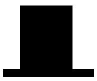
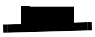

Status LEDs
Ethernet Cable connectors
MDI Button controls the fifth connector, making it crossed or non-crossed.

Figure 3-144   Ethernet Switch (5-port example)

:

Table 3-22   MDI Button Position Descriptions

POSITION	LABEL	FUNCTION
	X To PC	To connect an end station or a Server to the Port
	= To HUB	To connect a HUB or another Switch to the Port

3-12-1 Local Network Connection to EchoPAC PC Workstation

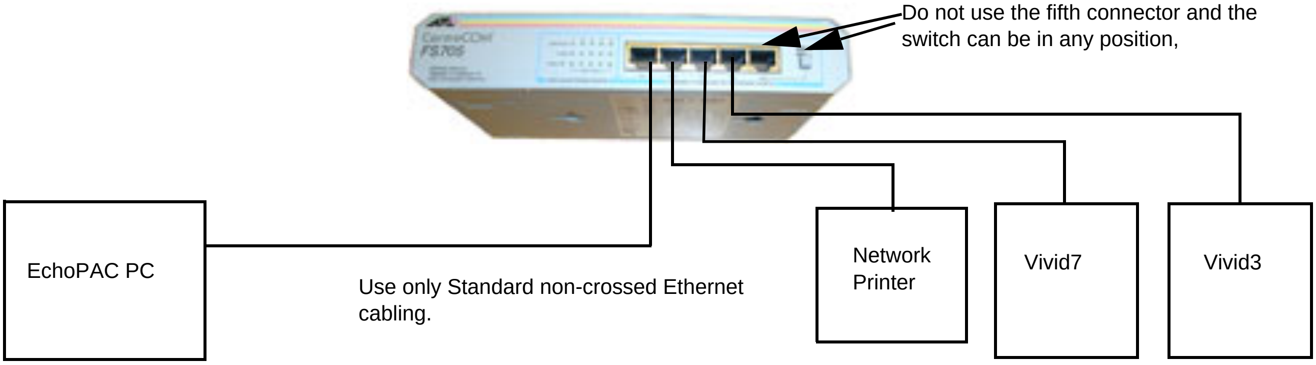

Do not use the fifth connector and the switch can be in any position,
EchoPAC PC
Use only Standard non-crossed Ethernet cabling.
Network Printer
Vivid7
Vivid3

Figure 3-145 Local Network Connection

3-12-2 Hospital Network Connection to EchoPAC PC Workstation

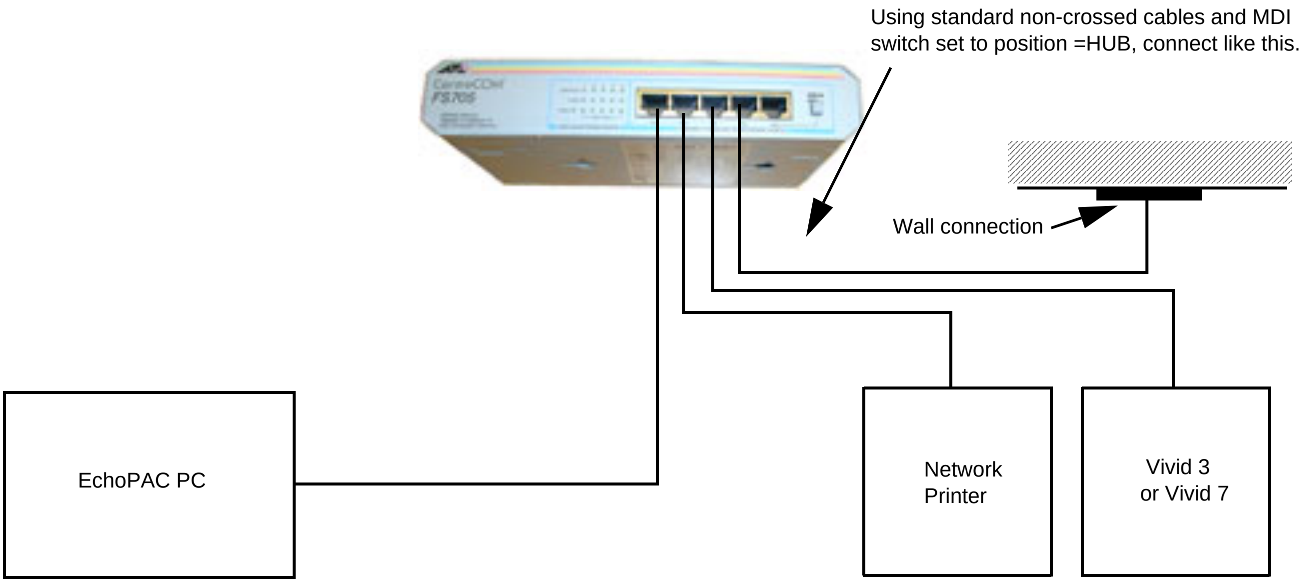

Using standard non-crossed cables and MDI switch set to position =HUB, connect like this.
Wall connection
EchoPAC PC
Network Printer
Vivid 3 or Vivid 7

Figure 3-146 Hospital Network Connections

See the **EchoPAC PC Service Manual**, Direction Number EP091298, for details about EchoPAC PC, and its set-up.

Section 3-13
Installation Paperwork

NOTE: *During and after installation, the documentation (i.e. CDs with documentation, User's Manuals, Installation Manuals etc.) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user informations are available during the operation and service of the complete system.*

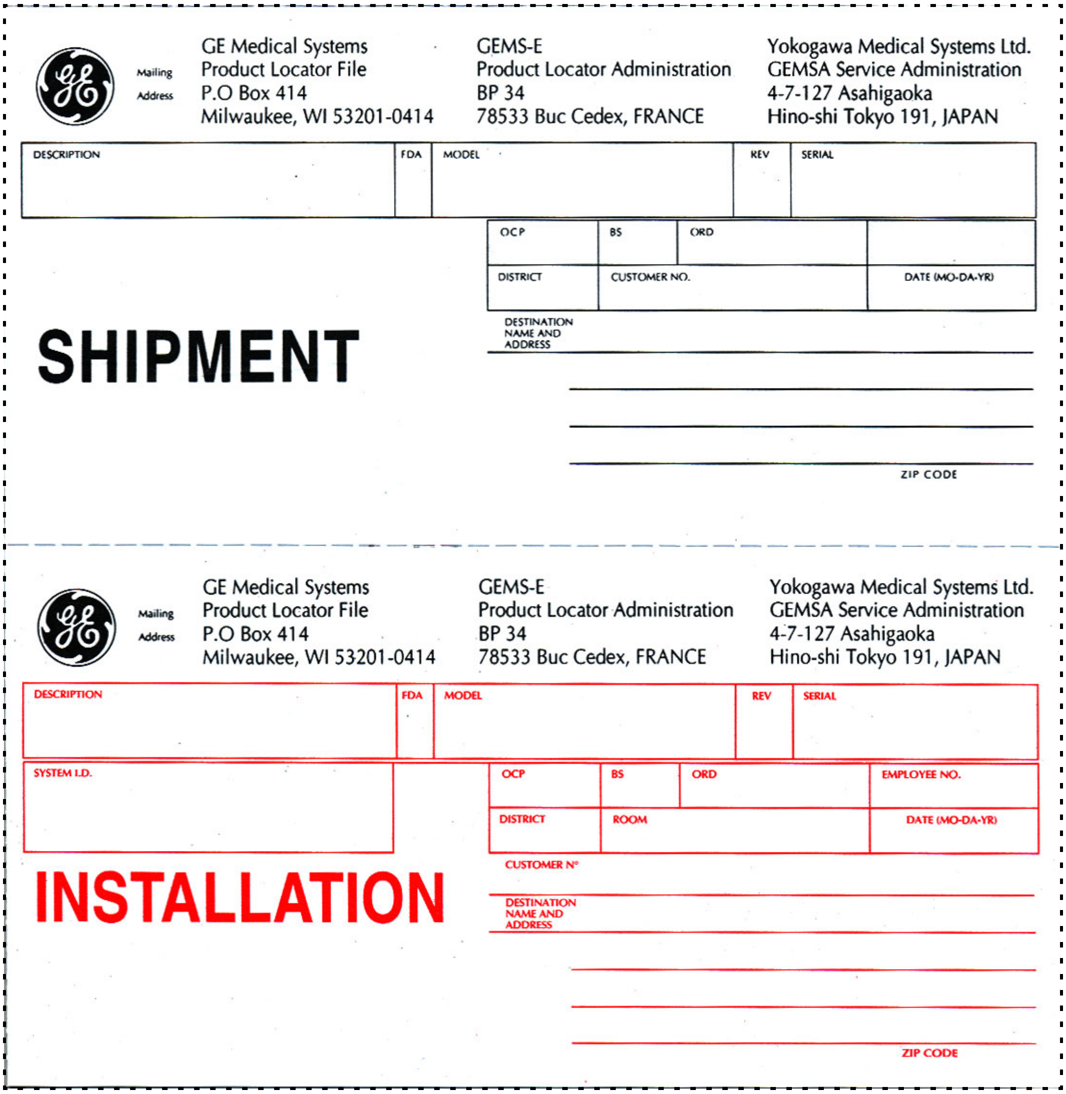
3-13-1 User's Manual(s)

Check that the correct User Manual(s) or CD with User Manuals, per software (sw) revision and language, for the system is included. See section 9-31 on page 9-105 for complete list of User's Manuals.

3-13-2 Product Locator Installation Card

NOTE: The Product Locator Installation Card shown may not be the same as the provided Product Locator card.

From the factory, a sheet with five Product Locator cards for transportation and one for Installation are included.



Mailing Address

GE Medical Systems
Product Locator File
P.O Box 414
Milwaukee, WI 53201-0414

GEMS-E
Product Locator Administration
BP 34
78533 Buc Cedex, FRANCE

Yokogawa Medical Systems Ltd.
GEMSA Service Administration
4-7-127 Asahigaoka
Hino-shi Tokyo 191, JAPAN

DESCRIPTION	FDA	MODEL	REV	SERIAL

OCP	BS	ORD	
DISTRICT	CUSTOMER NO.		DATE (MO-DA-YR)

SHIPMENT

DESTINATION NAME AND ADDRESS

ZIP CODE

Mailing Address

GE Medical Systems
Product Locator File
P.O Box 414
Milwaukee, WI 53201-0414

GEMS-E
Product Locator Administration
BP 34
78533 Buc Cedex, FRANCE

Yokogawa Medical Systems Ltd.
GEMSA Service Administration
4-7-127 Asahigaoka
Hino-shi Tokyo 191, JAPAN

DESCRIPTION	FDA	MODEL	REV	SERIAL

SYSTEM I.D.

OCP	BS	ORD	EMPLOYEE NO.
DISTRICT	ROOM		DATE (MO-DA-YR)

INSTALLATION

CUSTOMER N°

DESTINATION NAME AND ADDRESS

ZIP CODE

Figure 3-147 Product Locator Installation Card (Example)

3-13-3 Post Delivery Check List

Before shipment from the factory, this product has been thoroughly tested and visually inspected. The product is a fine tuned electronic instrument and should be treated properly during transportation.

To learn about any issues that are discovered at the reception of the package or when unpacking and installing the product, the Post Delivery Checklist has been introduced.

- Please complete the form on the back of this reminder, the Post Delivery Checklist, and mail or fax it to our System Test department as soon as you have unpacked, installed and verified the product.
- If you prefer to use E-mail, you can report your findings in an E-mail and send it to:

  NORWSYS@med.ge.com

3-13-3-1 Contact Information for the Post Delivery Checklist

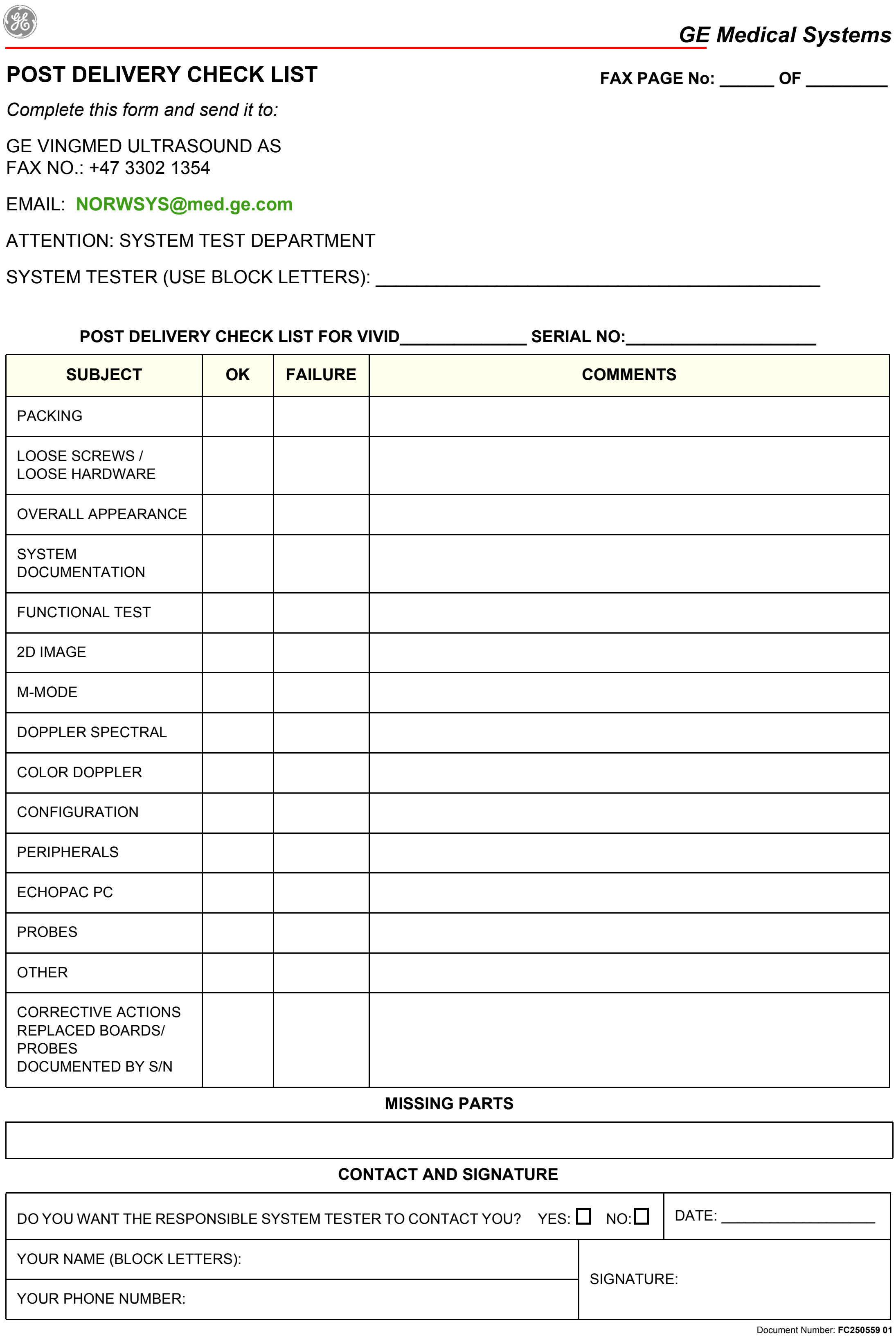
GE Vingmed Ultrasound AS
P. O. Box 141

N-3191 Horten, NORWAY

Phone: +47 3302 1100

Fax: +47 3302 1354

E-mail: NORWSYS@med.ge.com



GE Medical Systems

POST DELIVERY CHECK LIST

FAX PAGE No: ______ OF ________

Complete this form and send it to:

GE VINGMED ULTRASOUND AS
FAX NO.: +47 3302 1354

EMAIL: **NORWSYS@med.ge.com**

ATTENTION: SYSTEM TEST DEPARTMENT

SYSTEM TESTER (USE BLOCK LETTERS): ____

POST DELIVERY CHECK LIST FOR VIVID____________ SERIAL NO:__________________

SUBJECT	OK	FAILURE	COMMENTS
PACKING			
LOOSE SCREWS / LOOSE HARDWARE			
OVERALL APPEARANCE			
SYSTEM DOCUMENTATION			
FUNCTIONAL TEST			
2D IMAGE			
M-MODE			
DOPPLER SPECTRAL			
COLOR DOPPLER			
CONFIGURATION			
PERIPHERALS			
ECHOPAC PC			
PROBES			
OTHER			
CORRECTIVE ACTIONS REPLACED BOARDS/ PROBES DOCUMENTED BY S/N			

MISSING PARTS

CONTACT AND SIGNATURE

DO YOU WANT THE RESPONSIBLE SYSTEM TESTER TO CONTACT YOU? YES: ☐ NO: ☐

DATE: __________________

YOUR NAME (BLOCK LETTERS):

YOUR PHONE NUMBER:

SIGNATURE:

Document Number: **FC250559 01**

Figure 3-148 Post Delivery Checklist

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Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter provides procedures for quickly checking major functions of the Vivid 7 scanner, diagnostics by using the built-in service software, and power supply adjustments.

4-1-2 Contents in Chapter 4

Table 4-1 Contents in chapter 4

SECTION	DESCRIPTION	PAGE NUMBER
4-1	Overview	4-1
4-2	General Procedures	4-2
4-3	Functional Checks	4-28
4-4	Application Turnover Check List	4-82
4-5	Power Supply	4-82
4-6	Site Log	4-82

4-1-3 Special Equipment Required

- An empty (blank) MO Disk;
  - P/N: 066E0519 (5.4 GB)
  - P/N: 066E0514 (8.6 GB)
  - P/N: 066E0516 (9.1 GB)
- Un-used/un-formatted CD-R discs
- Un-used/un-formatted DVD-R discs
- ECG Pads
- ECG Harness, CABLE ECG MARQ. AHA/AMERICA, P/N:164L0025
  - CABLE ECG MARQ. AHA/AMERICA, P/N:164L0025
  - LEADWIRES ECG MARQ. AHA/AMERICA, P/N: 164L0027

  or

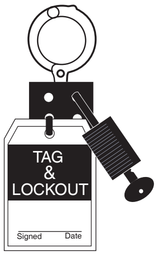
  - CABLE ECG MARQ. IEC / EU + AS, P/N:164L0026
  - LEADWIRES ECG MARQ. IEC / EU + AS, P/N:164L0028
- At least one probe (ideally you should check all the probes used on the system by the site.) See Probes on page 9-80, for an overview of available probes.

Section 4-2
General Procedures

⚠ **NOTICE** SYSTEM REQUIRES ALL COVERS

Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

⚠ **WARNING** ***ENERGY CONTROL AND POWER LOCKOUT FOR Vivid 7***



When servicing parts of the system where there is exposure to voltage greater than 30 Volts: Unplug the system Maintain control of the system power plug There are no test points to verify isolation, you must wait for at least 20 seconds for capacitors to discharge Beware that the AC Control Box, Front End Processor and Back End Processor may be energized even if the power is turned off when the cord is still plugged into the AC Outlet.

4-2-1 Overview

Some procedures are used more often than other. The intention with this section is to keep the most used procedures in one place.

4-2-2 Power ON/ Boot UP

4-2-2-1 Connect Mains Power to the Scanner

⚠ **DANGER** **ALWAYS CONNECT THE UNIT TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.**

⚠ **DANGER** **NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.**

⚠ **DANGER** **ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).**

⚠ **CAUTION** **SYSTEM REQUIRES ALL COVERS**

OPERATE THIS UNIT ONLY WHEN ALL BOARD COVERS AND FRAME PANELS ARE SECURELY IN PLACE. THE COVERS ARE REQUIRED FOR SAFE OPERATION, GOOD SYSTEM PERFORMANCE AND COOLING PURPOSES.

⚠ **NOTICE** **Use only power supply cords, cables and plugs provided by or designated by GE Healthcare.**

NOTE: Do not cycle the Circuit Breaker ON-OFF-ON in less than five -5- seconds. When turning OFF the Circuit Breaker, the system should de-energize completely before turning the circuit breaker ON.

NOTE: When turning on a system from standby mode, it takes a few seconds before it responds. Do not push the On/off button again during this period. A second push will initiate a full shutdown.

NOTE: If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on.

Follow These Steps to Connect Mains Power to the Unit

Connecting the Vivid 7 ultrasound unit involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1.) Ensure that the wall outlet is of appropriate type, and that the power Circuit Breaker is turned off.
2.) Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3.) Verify that the power cable is without any visible scratches or any sign of damage.
4.) Verify that the on-site mains voltage is within the limits indicated on the rating label near the Circuit Breaker at the rear of the unit.

4-2-2-1 Connect Mains Power to the Scanner (cont'd)

5.) Connect the Power Cable's female plug to the Power Inlet at the rear of the unit.

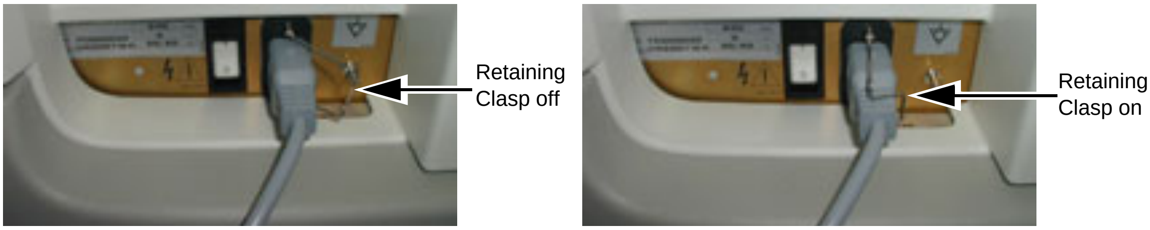

Retaining
Clasp off
Retaining
Clasp on

Figure 4-1 Female power plug with retaining clasp off (to the left) and on (to the right)

6.) Lock the plug in position with the Retaining Clasp.

7.) Verify that the Mains Power Circuit Breaker is in OFF position, if not, switch it OFF.

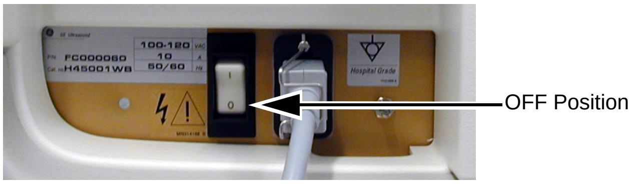

100-120
10
50/60
FC000060
H45001WB
OFF Position

Figure 4-2 Mains Power Circuit Breaker is in OFF position

8.) Connect the Power Cable's other end (male plug) to a hospital grade mains power outlet with the proper rated voltage, and the unit is ready for Power ON/Bootup.

4-2-2-2 Turn Unit On

1.) Switch ON the Mains Power Circuit Breaker at the rear of the unit.

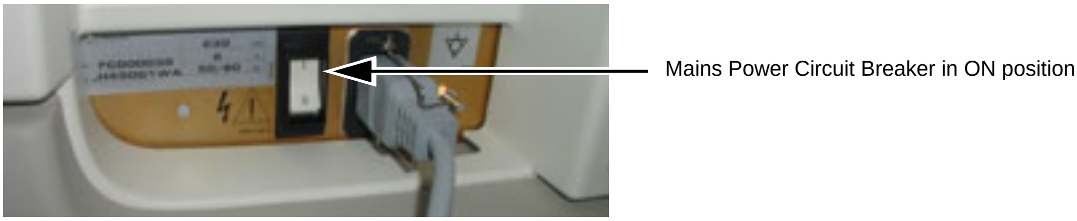


Figure 4-3 Switch Mains Power Circuit Breaker ON

You should hear a “click” from the relays in the AC Power/AC Controller and the unit is ready to boot.

NOTE: *If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on.*

2.) Press once on the **ON/STANDBY** key on the Operator Panel to boot the unit.

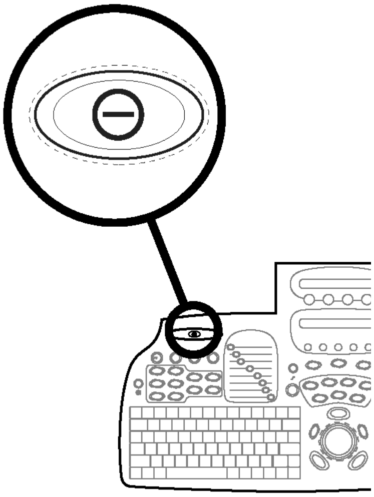


Figure 4-4 Press the On/Standby key on the Operator Panel once to boot the unit

During a normal boot, you may observe that:

a.) The unit’s ventilation fan starts at full speed, but slows down after a few seconds (listen to the fan noise).

b.) Power is distributed to the peripherals, Operator Panel (Console), Monitor, Front-End Processor and Back-End Processor.

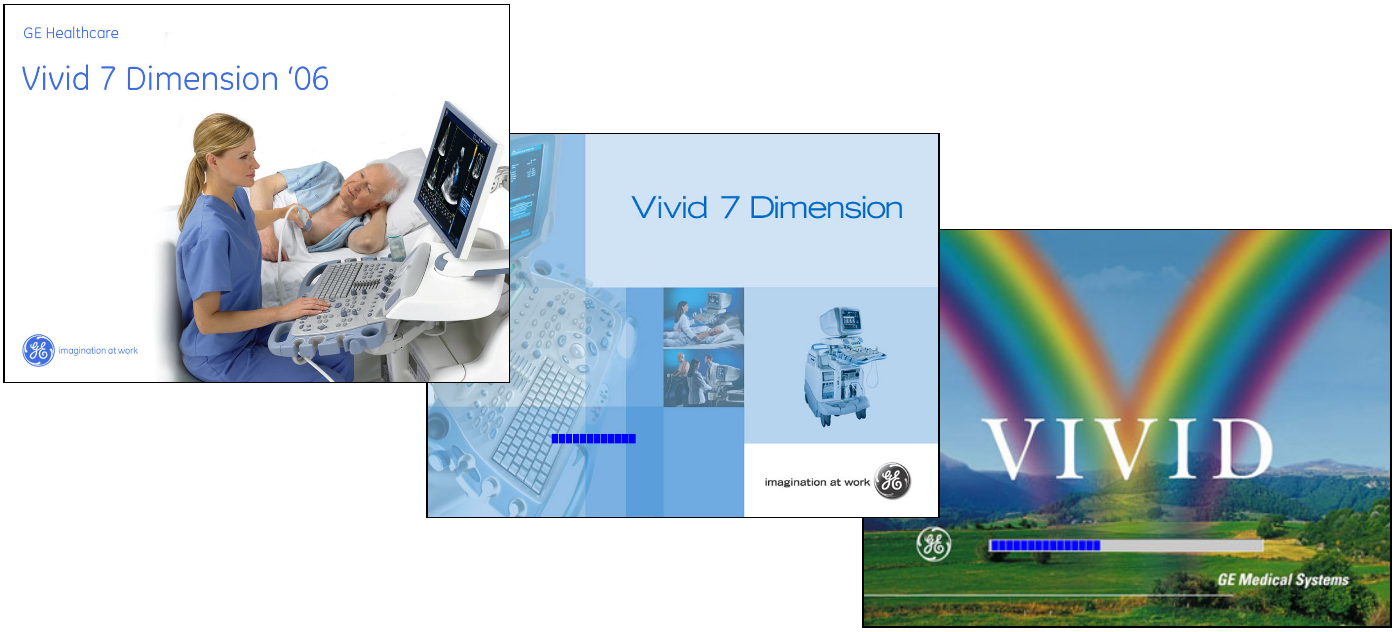
c.) Back-End Processor and rest of Scanner starts with the sequence listed in the next steps:

d.) Back-End Processor is turned ON and starts to load the software.

e.) The Start Screen (Vivid) is displayed on the monitor

4-2-2-2 Turn Unit On (cont'd)

f.) A start-up bar indicating the time used for software loading, is displayed on the monitor.


GE Healthcare
Vivid 7 Dimension '06
imagination at work
Vivid 7 Dimension
imagination at work
VIVID
GE Medical Systems

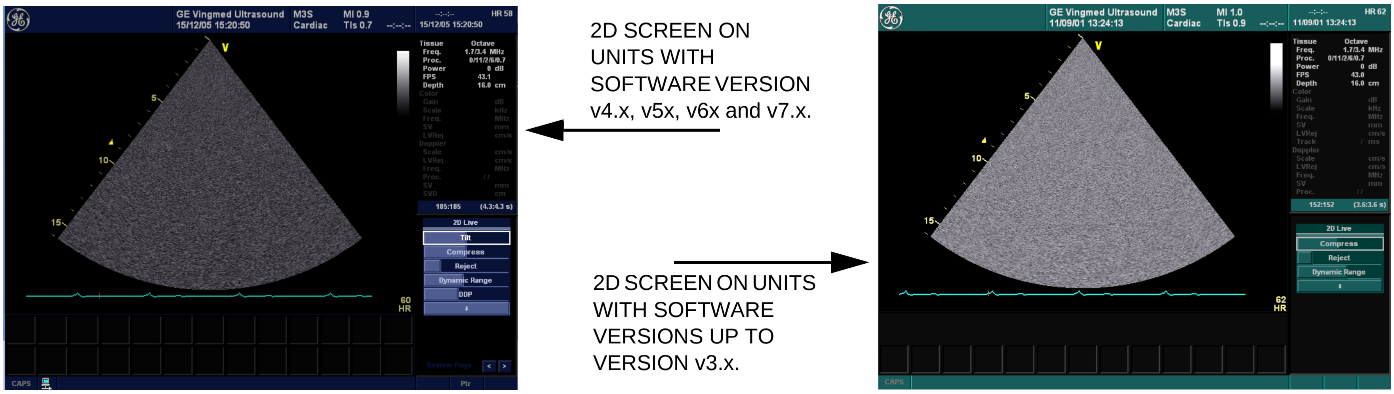
The Start-Up Screen (Splash Screen) Is different, depending on software version and Vivid 7 model. Vivid 7 Dimension with software version v6.1 or higher (upper, left), Vivid 7 Dimension with software version v4.0 to v6.1.x, (middle) and Vivid 7 with software versions v3.x.x and lower (lower, right).

Figure 4-5 Start-up bar

g.) The software initiates and sets up the Front-End electronics and the rest of the instrument.

h.) The backlight in the keyboard is lit.

i.) As soon as the software has been loaded, a 2D screen is displayed on the screen.


GE Vingmed Ultrasound
M3S
Cardiac
2D Live
Compress
Reject
Dynamic Range

2D SCREEN ON UNITS WITH SOFTWARE VERSION v4.x, v5x, v6x and v7.x.

2D SCREEN ON UNITS WITH SOFTWARE VERSIONS UP TO VERSION v3.x.

Figure 4-6 2D Screen on the display.

NOTE: Total time used for start-up is typical three minutes or less, depending on software version and Vivid 7 model.

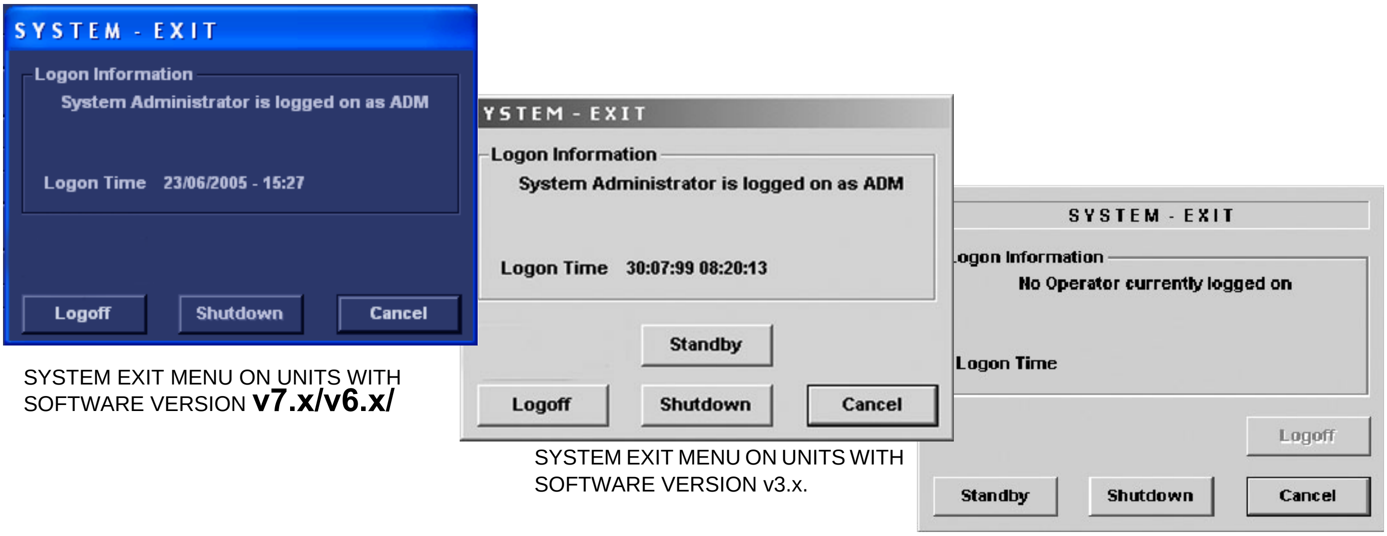
4-2-3 Power Shut Down

When you switch off the unit, the system performs an automatic shutdown sequence.

Depending on software version, the following Shut Down modes are available:

- Standby Mode (Only available on units with software version v2.x and v3.x.)
- Full Shut Down

The SYSTEM - EXIT menu, used when switching off the unit, gives you the choices described below.


SYSTEM - EXIT
Logon Information
Logoff
Shutdown
Cancel
YSTEM - EXIT
Logon Information
Standby
Logoff
Shutdown
Cancel
SYSTEM - EXIT
ogon Information
Logoff
Standby
Shutdown
Cancel

System Administrator is logged on as ADM

Logon Time 23/06/2005 - 15:27

SYSTEM EXIT MENU ON UNITS WITH SOFTWARE VERSION **v7.x/v6.x/**

System Administrator is logged on as ADM

Logon Time 30:07:99 08:20:13

SYSTEM EXIT MENU ON UNITS WITH SOFTWARE VERSION v3.x.

No Operator currently logged on

Logon Time

SYSTEM EXIT MENU ON UNITS WITH SOFTWARE VERSION v2.x.

Figure 4-7 System - Exit menu

4-2-3 Power Shut Down (cont’d)

Standby

NOTE: The Standby mode is only supported by units with software version v2.x and v3.x.

Use this button to select the Standby mode, allowing a shorter reboot time. Most of the system is powered down, but a certain portion of the unit remains energized. The standby mode allows a shorter reboot time when the system is used on a daily basis or moved from one place to another.

See 4-2-3-1 "Standby Mode" on page 4-10 for more info about the use of Standby.

4-2-3 Power Shut Down (cont'd)

Logoff

Use this button to log off the current user.
The system remains on and ready for a new user to log on.
(If the Logoff button is dimmed, it indicates that no user is logged on to the unit at the moment.)

Shutdown

Use this button to Shut Down the system. The entire system is shut down. It is recommended to perform a full shutdown at least once a week.

Cancel

- Use this button to exit from the System-Exit menu and return to the previous operation.

4-2-3-1 Standby Mode

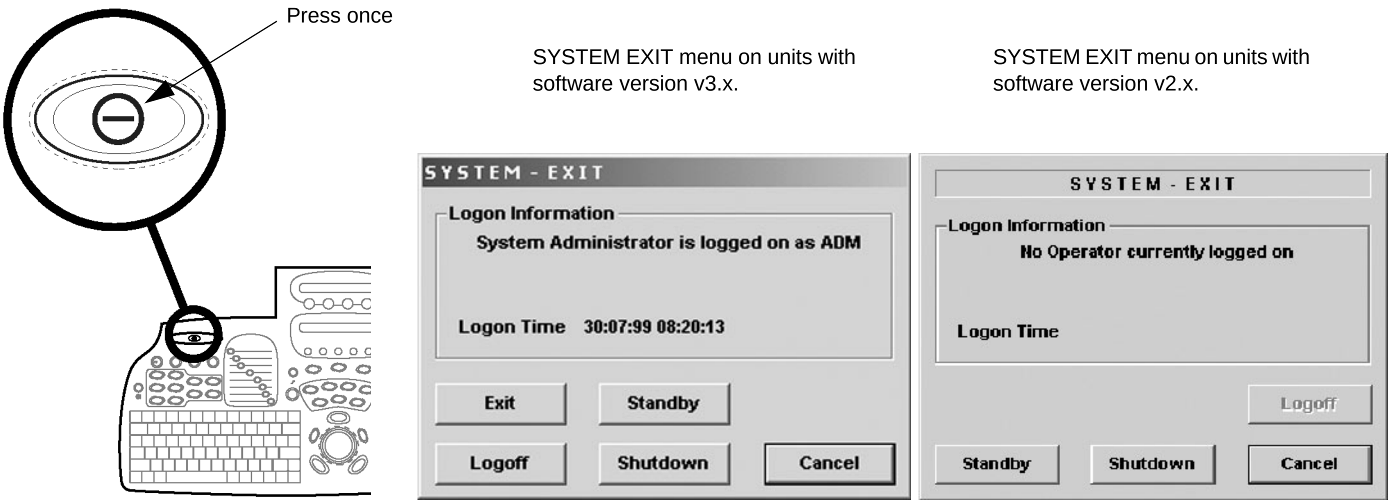
NOTE: The Standby mode is supported by units with software version v2.x and v3.x ONLY.

Select Standby Mode

This procedure describes the needed steps to power down the unit to Standby mode:

NOTE: Don't press the **ON/STANDBY** *button too long. If you press the button too long (more than 3-4 seconds), a full shutdown is started.*

1.) Press the **ON/STANDBY** key on the Operator Panel *once* to display the System - Exit menu on the screen.



SYSTEM EXIT menu on units with software version v3.x.

SYSTEM EXIT menu on units with software version v2.x.

SYSTEM - EXIT

Logon Information
System Administrator is logged on as ADM

Logon Time 30:07:99 08:20:13

SYSTEM - EXIT

Logon Information
No Operator currently logged on

Logon Time

Figure 4-8 Press ON/Standby key once to display the SYSTEM - EXIT menu

2.) Select **Standby** to activate Standby mode. Leave the mains power cable connected and the **MAINS CIRCUIT BREAKER** ON to keep the Un-interrupted Power Supply (UPS) battery fully charged.

Disconnect Power Cable When Unit is in Standby Mode

1.) Switch off the Mains Circuit Breaker.

2.) Disconnect the power cable.

The system will remain in Standby mode for approximately 15 minutes if the standby battery is fully charged. If the system is unplugged for a longer period of time, a full shutdown is automatically performed.

As described above, the battery is automatically charged when the system is plugged into the wall outlet and the circuit breaker is switched on. It takes about 10 hours uninterrupted, to charge a flat battery.

If the system is left in the OFF condition (Circuit breaker in the OFF position and system unplugged from the wall out let) for an extended period of time (3 to 5 days or more), the system may not bootup or may beep when turned ON. Should this occur, the system needs to recharge the UPS batteries. This could take 15 minutes to as long as 10 hours uninterrupted, depending on the battery age, system input voltage and system temperature. To eliminate draining the UPS batteries, the system should remain plugged into the wall outlet with the circuit breaker in the ON position.

4-2-3-1 Standby Mode (cont'd)

NOTE: *Connect the power cable to the mains power outlet again as soon as possible and at least before you switch on the Mains Circuit Breaker and press the* **ON/STANDBY** *key.*

NOTE: *When turning ON a system from standby mode, it takes a few seconds before it responds. Do not push the* **ON/STANDBY** *button again during this period. A second push will initiate a full shutdown.*

4-2-3-2 Complete Power Down

NOTE: *This function is not available from Standby mode.*

Complete Power Down Procedure

1.) Press the **ON/STANDBY** key on the Operator Panel once to display the System - Exit menu.

2.) Select **Shutdown** to do a complete power down of the unit.

Back-End Processor will first turn OFF the Scanner activity and print the message “Please wait - Shutdown in progress” in the LCD display on the Operator Panel. Then it starts to shut down itself. The time to turn down the unit including the Back-End Processor, may vary from 10 seconds up to approximately 1 minute. The last thing that shuts down, is the light in the LCD displays, indicating that you can continue with the next step.

3.) Switch OFF the mains power **CIRCUIT BREAKER** (located at the rear of the unit). This will cut power distribution within the unit.

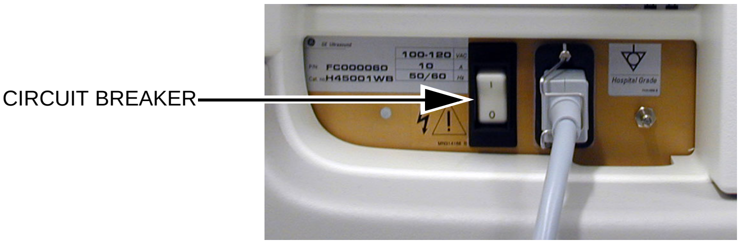


Figure 4-9 Circuit Breaker located on rear of the unit

If the Back-End Processor is still running when you switch off the mains power **CIRCUIT BREAKER**, the internal Un-interrupted Power Supply (UPS) will switch over to battery power and supply the Back-End Processor with power until it has shut down properly.

A periodic high-pitched sound alarm indicates that the Back-End Processor is running on battery power.

4-2-4 Log On to the System as ‘ADM’

Table 4-2 Log on to the system as ‘ADM’

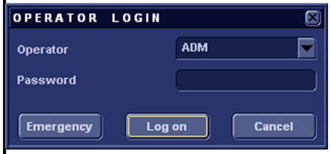
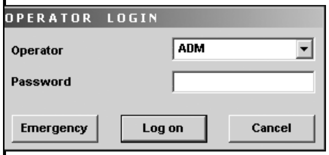
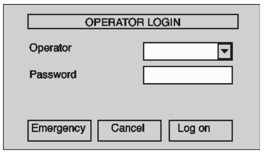
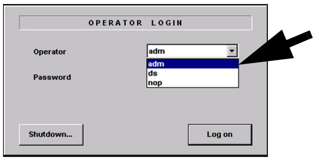
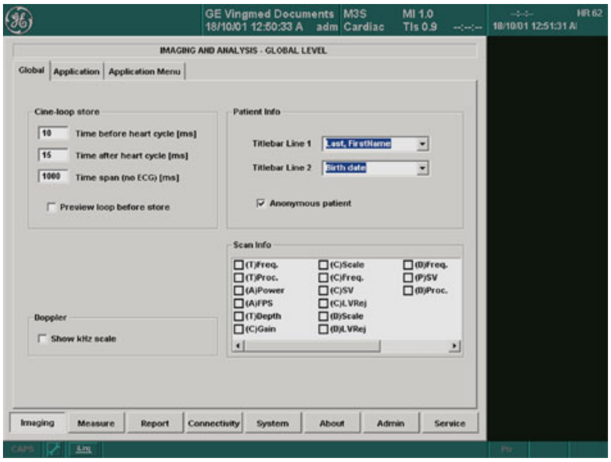
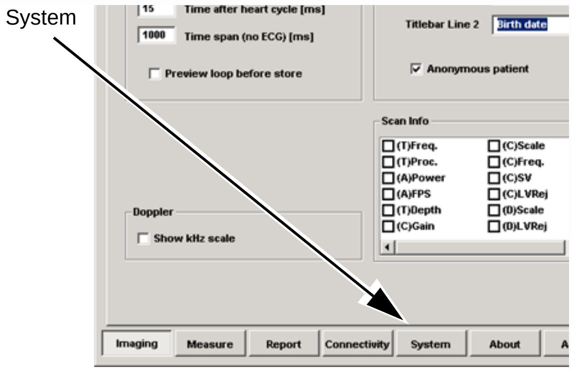
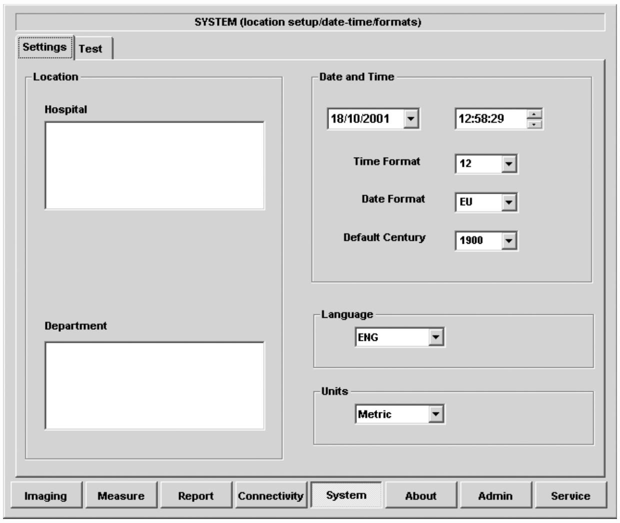
Step	Task	Expected Result(s)
1.	Press **CONFIG** on the alphanumeric keyboard.	If not already logged on, the Operator Login window is displayed.  OPERATOR LOGIN Emergency Log on Cancel Operator: ADM Password: Operator Login window (BT’04 and newer)  OPERATOR LOGIN Emergency Log on Cancel Operator: ADM Password: Operator Login window (BT’03 software)  OPERATOR LOGIN Operator Password Emergency Cancel Log on Operator Login window (BT’01 and BT’02 software)
2.	a) Select the down-arrow to the right of the Operator field to view the Operator pull- down menu with a list of users- b) Select **ADM** from the pull-down menu.  OPERATOR LOGIN Operator Password adm adm ds nop Shutdown... Log on	From the factory, two users are defined: **- ADM** **- USR** **Regarding the password:** - Starting with software version v6.0, the password for the user **ADM** is: **ulsadm** - For software v5.x and lower, the default password has been left blank for both users, so you may try to log on without any password. - If the logon fails, you may try to use the password **service** - As a last resort, contact the hospital’s network administrator (or person responsible for the ultrasound unit), and ask for the password. - It is possible for the administrator (*adm*) to make new users and establish unique passwords for each user, but don’t do it now. The **Emergency** button stores data only from current patient examination.
3.	Select **Log on**.	- If this is the first time the unit is turned on, the “IMAGING AND ANALYSIS - GLOBAL LEVEL” window is displayed. - If another screen was displayed earlier, before logging out or turning unit off, that screen will be displayed.  GE Vingmed Documents 18/10/01 12:50:33 A adm M3S Cardiac MI 1.0 TIs 0.9 HR 62 18/10/01 12:51:31 A IMAGING AND ANALYSIS - GLOBAL LEVEL Global Application Application Menu Cine-loop store Patient Info Scan Info Doppler Imaging Measure Report Connectivity System About Admin Service 10 Time before heart cycle [ms] 15 Time after heart cycle [ms] 1000 Time span (no ECG) [ms] ☐ Preview loop before store Titlebar Line 1: Last, FirstName Titlebar Line 2: Birth date ☑ Anonymous patient ☐ (T)Freq. ☐ (C)Scale ☐ (D)Freq. ☐ (T)Proc. ☐ (C)Freq. ☐ (P)SV ☐ (A)Power ☐ (C)SV ☐ (D)Proc. ☐ (A)FPS ☐ (C)LVRej ☐ (T)Depth ☐ (D)Scale ☐ (C)Gain ☐ (D)LVRej ☐ Show kHz scale This window may be slightly different, depending on the software version.

Table 4-2 Log on to the system as ‘ADM’ (cont’d)

Step	Task	Expected Result(s)
4.	Select **System** to select the System Setup window.  System Scan Info Doppler Imaging Measure Report Connectivity System About A 15 Time after heart cycle [ms] 1000 Time span (no ECG) [ms] ☐ Preview loop before store Titlebar Line 2 Birth date ☑ Anonymous patient ☐ (T)Freq. ☐ (C)Scale ☐ (T)Proc. ☐ (C)Freq. ☐ (A)Power ☐ (C)SV ☐ (A)FPS ☐ (C)LVRej ☐ (T)Depth ☐ (D)Scale ☐ (C)Gain ☐ (D)LVRej ☐ Show kHz scale These windows (above and to the right) may be slightly different, and in other colors, depending on the software version.	The System Settings window is displayed .  SYSTEM (location setup/date-time/formats) Settings Test Location Hospital Department Date and Time Language Units Imaging Measure Report Connectivity System About Admin Service 18/10/2001 12:58:29 Time Format 12 Date Format EU Default Century 1900 Language ENG Units Metric

4-2-5 Using Removable Media

4-2-5-1 Introduction

Vivid 7 is equipped with a CD/DVD drive (earlier versions have a CD drive) and an optional Magneto Optical Disk Drive (MO Drive). Both drives are available from the front of the unit, below the Patient I/O panel.

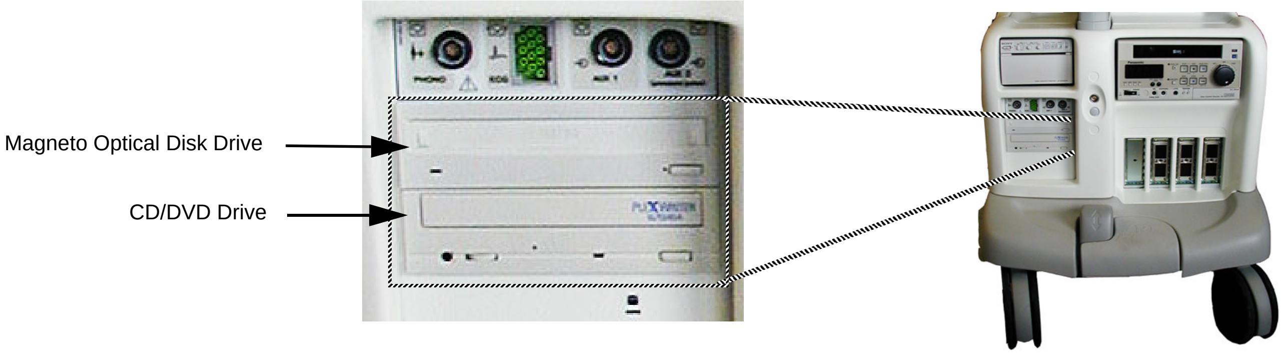


Figure 4-10 MO Drive and CD Drive

4-2-5-2 Install MO Disk in MO Drive

⚠ **NOTICE** **Never move the unit with a MO disk in the Magneto Optical Disk Drive because the drive actuator will not be locked and the Magneto Optical Disk Drive could break.**

1.) Preparations before installing an MO disk in the MO Drive:
    a.) The unit must be turned on and “up and running” before using the MO Drive
    b.) Verify the MO disk for loose hardware or damaged labels which could jam inside the MO Drive.
    c.) Ensure that the slide switch in one corner of the disk is set so that the disk is write enabled (disk hole closed).
2.) Insert the disk into the MO Disk Drive with the label for the side you intend to use, facing up.

4-2-5-3 Eject and Remove MO Disk from MO Drive

NOTICE Do not eject the MO Disk using the button on front of the MO drive.

1.) Eject the MO Disk, using one of the methods described in the following steps:
   a.) In some cases, the MO Disk is ejected automatically.
   b.) If not automatically ejected, use manual ejection method:
   - Select **Eject** button on the screen, or
   - Press **ALT** + **E** on the alphanumeric keyboard to display the Eject Device menu.

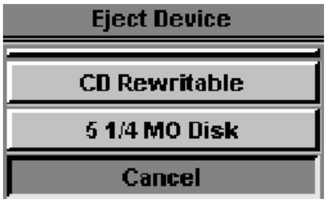


Figure 4-11 The Eject Device menu

4-2-5-3 Eject and Remove MO Disk from MO Drive (cont'd)

2.) Select **5 1/4 MO Disk** in the Eject Device menu to eject the MO Disk.
3.) Remove the ejected MO Disk from the MO Drive and store it in it's cover box in a safe place.

4-2-5-4 Install CD-R Disc in CD Drive

NOTE: *CD-RW discs are NOT supported by Vivid 7, but CD-R discs may be used.*

1.) Press the Eject button on the right side of the CD Drive once to open the disc tray.
2.) Put a CD-R disc in the disc tray with the label side facing up.
3.) Press the Eject button once to close the disc tray. The disc is available for reading, formatting or writing, dependant on the disc you used, after a few seconds.

4-2-5-5 Eject and Remove CD-R Disc from CD Drive

NOTICE Do not eject the CD-R disc using the button on front of the CD Drive.

1.) Eject the CD-R disc, using one of the methods described in the following steps:
  a.) In some cases, the CD-R disc is ejected automatically.
  b.) If not automatically ejected, use manual ejection method:
  - Select Eject button on the screen, or
  - Press **ALT** + **E** on the alphanumeric keyboard to display the Eject Device menu.

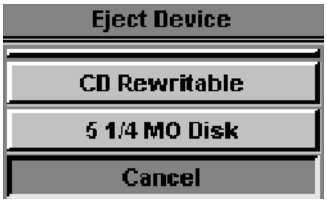


Figure 4-12 The Eject Device menu

2.) Select **CD-Rewriteable** in the Eject Device menu to eject the CD-R disc.
3.) Remove the ejected CD-R disc from the CD Drive and store it in it's cover in a safe place.

4-2-6 Labeling Removable Media

Before you start to format any Removable Media, be sure about what naming convention you will use for labelling.

You will need separate Removable Media for:

Archiving Images

- Use a logical name and make sure to physically label each Removable Media.
- Verify that each Removable Media gets a unique name. Maximum eleven (11) characters may be used for the label name.
- Remember that MO Disks have two sides, Side A and Side B. Each Side must have a unique name.

Example: MO Disks for storing images may be labeled "IMAGE_1A" (Side A on MO Disk #1), "IMAGE_1B" (Side B on MO Disk #2), "IMAGE_2A"...

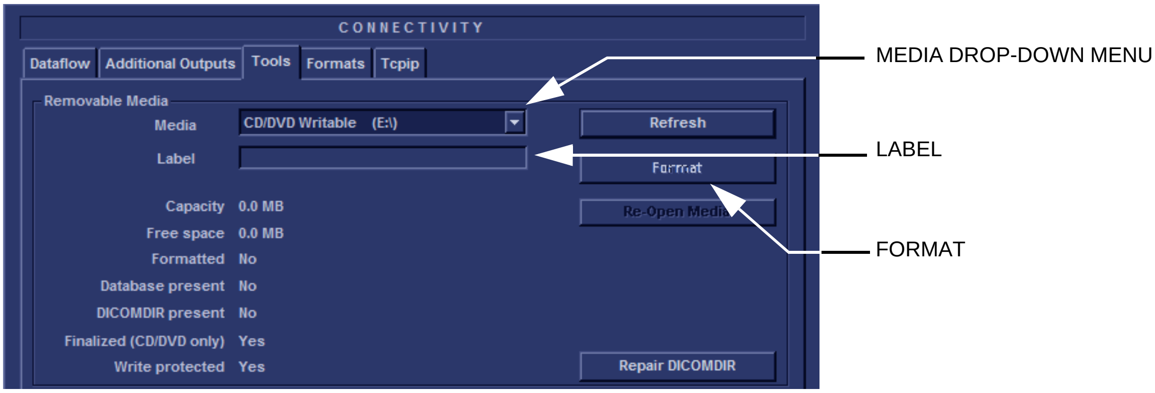
4-2-7 Formatting Removable Media - Software Version v3.x and above

This procedure describes how to format an MO disk or a CD-R disc.

NOTE: CD-RW discs are NOT supported by Vivid 7, but CD-R discs may be used.

Before you continue, be sure about what naming convention you will use for labelling the Removable Media.

1.) Select **Config > Connectivity > Tools**



Removable Media
Media: CD/DVD Writable (E:\)
Label:
Capacity: 0.0 MB
Free space: 0.0 MB
Formatted: No
Database present: No
DICOMDIR present: No
Finalized (CD/DVD only): Yes
Write protected: Yes

CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Refresh
Format
Re-Open Media
Repair DICOMDIR
MEDIA DROP-DOWN MENU
LABEL
FORMAT

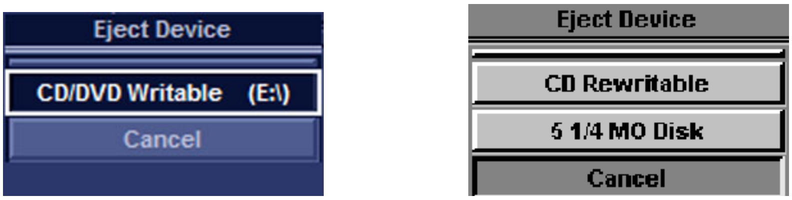
Figure 4-13 The Tools screen

2.) Select the removable media from the *Media drop-down* menu.
3.) Enter a name for the removable media in the *Label* field.
4.) Press **Format**.
5.) Wait for the display of the *Information window* indicating that the formatting process is completed.

NOTE: Do not eject the CD using the button on the CD drive

6.) Press **ALT+E** to display the **Eject Device** menu.

NOTE: Depending on the software version, the color on the menus may vary. Depending on available Removable Media, the number of choices in the menu will vary.



Eject Device
CD/DVD Writable (E:\)
Cancel
Eject Device
CD Rewritable
5 1/4 MO Disk
Cancel

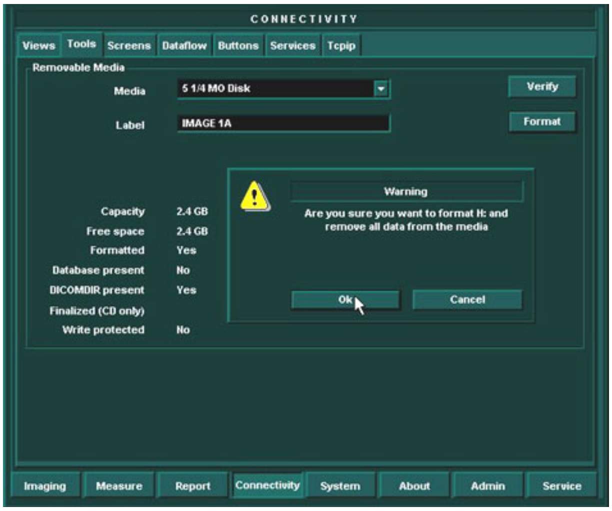
Figure 4-14 Eject Device menu

7.) Select the relevant media. The selected media is ejected.

4-2-8 Formatting Removable Media - Software Version v2.x

NOTE: When formatting the MO disks, give them logical names and make sure to physically label the disks.
- A labelling convention should be followed so that each MO disk gets a unique label.
- A maximum numbers of eleven (11) label characters are allowed in the label name.
- Use different labels on the MO disk's A side and B side.

1.) Label the MO Disks sequentially, i.e Image 1A (Side A), Image 1B (side B), Image 2A etc.
2.) Insert an MO disk, side A, into the empty MO drive.
3.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
4.) Select **Connectivity** in the Image and Analysis menu.
5.) Select **Tools** in the Connectivity menu.
6.) In the Label window, type the same name as labelled on the MO disk side A.
7.) Select **Format.**



Media: 5 1/4 MO Disk
Label: IMAGE 1A
Capacity: 2.4 GB
Free space: 2.4 GB
Formatted: Yes
Database present: No
DICOMDIR present: Yes
Finalized (CD only):
Write protected: No

Warning
Are you sure you want to format H: and remove all data from the media

Figure 4-15 Prepare MO Disk - Image Storage

8.) A warning "Are you sure you want to format H: and remove all data from the media" appears, select **OK.**
9.) Wait until the information dialogue window appears on screen.
10.) Select **OK** to continue.
11.) Verify the disk formatting status has been updated.
12.) Press **ALT-E.**
13.) Select the *5 1/4 MO Disk*, to eject Disk.
14.) Insert the MO disk, side B and repeat step 6 to 13.

4-2-9 Verifying Removable Media

1.) Insert the removable media you are going to verify into the correct drive
2.) Select the pre-configured removable media from the **Config > Connectivity > Tools Media** drop-down menu.
3.) Press **Verify**. The unit starts to verify the DICOM directory on the selected media.

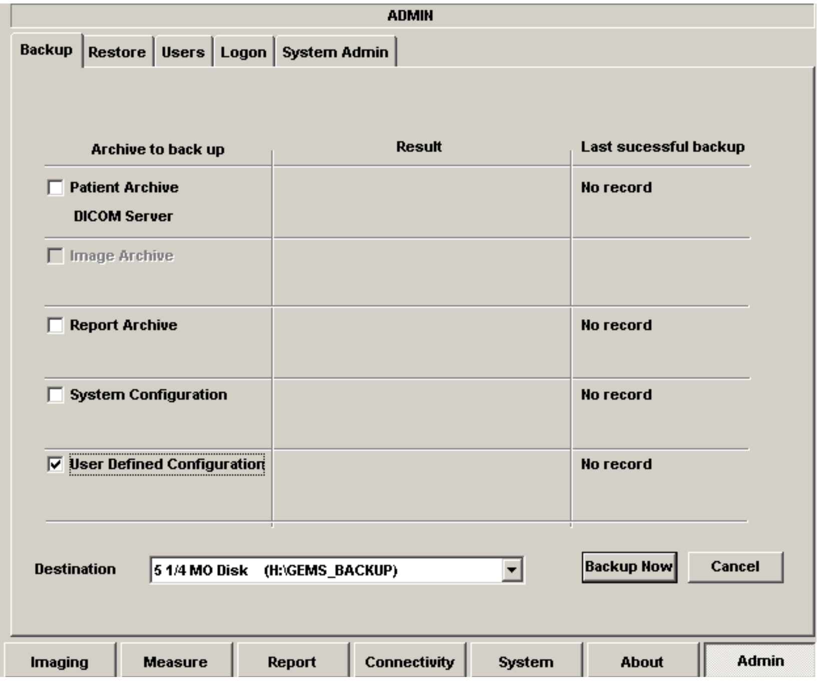
4-2-10 Archiving and Loading Presets - Software Version v2.x/v3.x

NOTE: *Always save presets before any software reload. This action is necessary to ensure that the presets loaded after the software reload are as up–to–date as possible.*

NOTICE Presets shouldn't be saved on the same MO disk as images, because the Archive Menu lists the images but not the presets stored on a MO disk.

4-2-10-1 Archiving Presets to an MO Disk

Table 4-3 Saving Presets

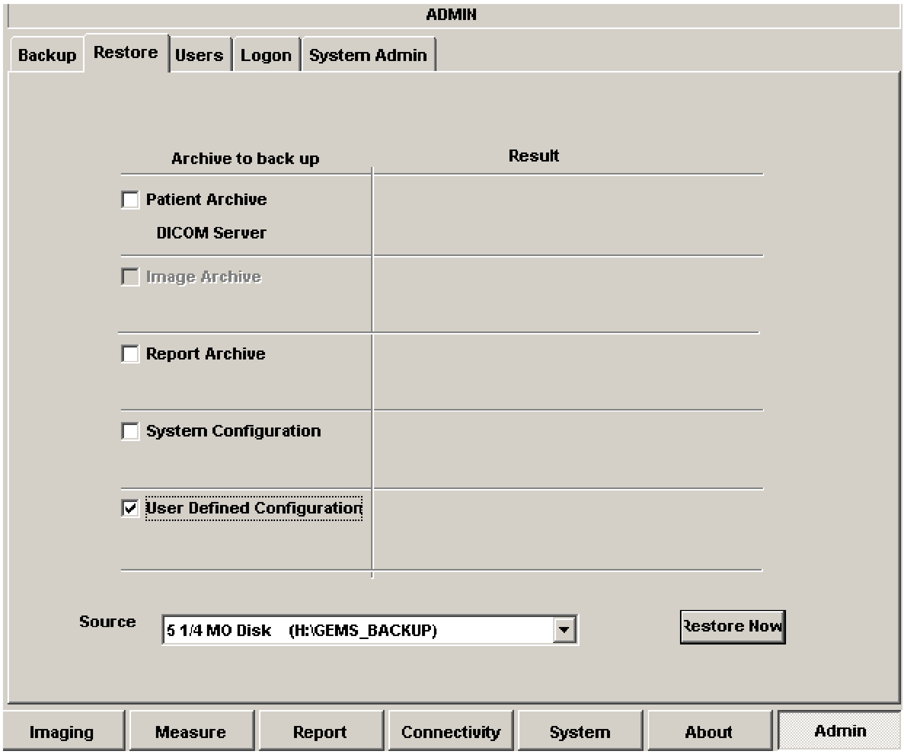
STEP	TASK	FUNCTION
1.	Insert an empty, formatted MO disk labelled "PRESETS" and marked with Vivid 7's serial number and the date, into the MO Drive. For more information about formatting, see 4-2-7 "Formatting Removable Media - Software Version v3.x and above" on page 4-17.	
2.	Go to Config (F2) -> Admin -> Backup	The Backup window is displayed.  ADMIN Backup Restore Users Logon System Admin Backup Now Cancel Imaging Measure Report Connectivity System About Admin Archive to back up / Result / Last sucessful backup ☐ Patient Archive DICOM Server — No record ☐ Image Archive ☐ Report Archive — No record ☐ System Configuration — No record ☑ User Defined Configuration — No record Destination 5 1/4 MO Disk (H:\GEMS_BACKUP)
3.	Select the Check box "User defined Configuration".	
4.	Select the MOD as destination.	
5.	Press **BACKUP NOW**.	A copy of the Presets is saved on the MO disk.
6.	Press **ALT** + **E** on the alphanumeric keyboard.	The MO disk is ejected.

4-2-10-2 Loading Presets from an MO Disk

NOTE: *It is not possible to move presets between units with different software versions.*

NOTE: *You can successfully copy presets from one V7 to another, provided they run the same software version.*

Table 4-4 Loading Presets

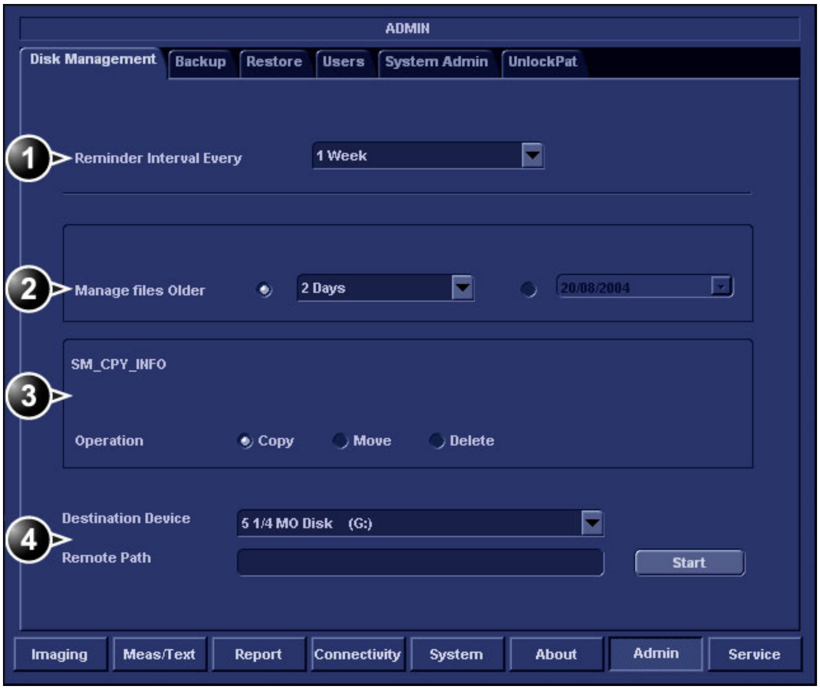
STEP	TASK	FUNCTION
1.	Insert the MO disk with the archived presets into the MOD.	
2.	Go to Config (F2) > Admin > Restore	The Restore window is displayed.  ADMIN Backup Restore Users Logon System Admin Archive to back up Result DICOM Server Restore Now Imaging Measure Report Connectivity System About Admin ☐ Patient Archive ☐ Image Archive ☐ Report Archive ☐ System Configuration ☑ User Defined Configuration Source: 5 1/4 MO Disk (H:\GEMS_BACKUP)
3.	Select the Check box “User defined Configuration”.	
4.	Select the MOD as source.	
5.	Press **RESTORE NOW**	The Presets are restored to the System.
6.	Press **ALT** + **E** on the alphanumeric keyboard.	The MO disk is ejected.

4-2-11 Space Management - Software version v7.x/v6.x/v5.x/v4.x

4-2-11-1 Configure the Disk Management Function

NOTE: Configuration of the Disk management system can only be done by user with administration rights.

1.) Press **Config (F2)**.
2.) Log on as **adm** (administrator).
3.) Select the category **Admin**.
4.) In the **Admin** category, select the **Disk Management** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat
1
2
3
4
Start
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Reminder Interval Every: 1 Week

Manage files Older: ● 2 Days ○ 20/08/2004

SM_CPY_INFO

Operation: ● Copy ○ Move ○ Delete

Destination Device: 5 1/4 MO Disk (G:)

Remote Path:

1. **Sets the reminder time interval for running Disk management.**
2. **Sets the files to be managed based on the examination dates.**
3. **Sets the Disk management to copy, move or delete images.**
4. **Sets the destination device.**

Figure 4-16 Disk Management

4-2-11-2 Disk Management Schedule Setting

- Next to **Reminder interval**, specify the number of days/weeks you want the system to prompt you to perform disk management.

  This setting should be set based on the activity of your office/institution. If **None** is selected, no reminder will be displayed.

4-2-11-3 Data Management Settings

1.) Select a number of days, weeks or months or a specific date next to **Manage files older than**.

Only files older than the specified setting will be copied or moved.

If **none** is selected, all files will be copied or moved.

2.) Next to **Operation** check:

- **Copy**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination. Using this setting, the files will exist in two locations, the local hard drive and the media used to copy to.
- **Move**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination, verified and then deleted from the local hard drive. Using this setting, the files will exist in one location, the media used to move the files to. They are removed from the local hard drive.
- **Delete**: the images and reports from the examinations older than the specified setting defined in step 1 are deleted from the hard drive.

4-2-11-4 Destination Device Setting

- Next to **Destination device**, select a removable media or a network shared folder.

*NOTE: To be able to select a network shared folder in the Destination device field, its path must have been entered once in the field next to **Remote path**.*

NOTICE If using removable media, it is recommended to use dedicated media to the Disk management process. Removable media used for data backup must not be used when performing Disk management.

Do not use the same removable media on several systems.

4-2-11-5 Running the Disk Management Function

The **Disk Management** function can be run at any time. In addition, the user may be prompted to run **Disk Management** if the time since the last **Disk Management** operation performed has reached the setting for the **Reminder Interval**, or if the local hard drive is about to be full.

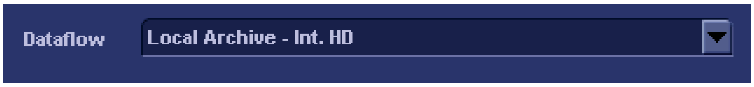
4-2-11-6 Manual Start of Disk Management

1.) Press **Archive** on the **Operator Panel**.
The **Search/Create patient window** is displayed.

2.) Press **More** in the **Search/Create patient window** to display additional menu options and select **Disk management**.

4-2-12 Backup - Software Version v7.x/v6.x/v5.x/v4.x

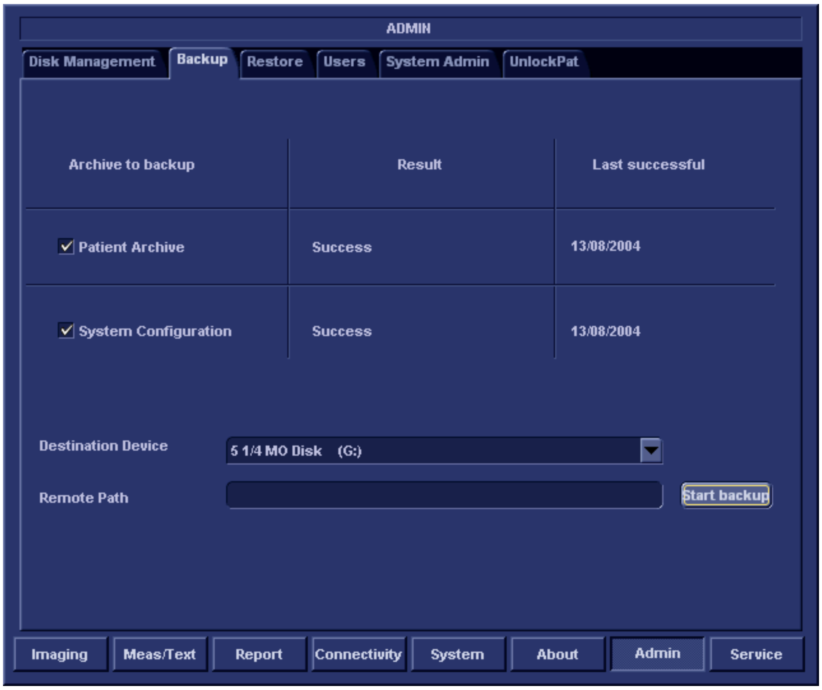
1.) Press **Archive**. The **Operator login** window is displayed.
2.) Log on as **Adm**. The **Search/Create patient** window is displayed.
3.) In the **Search/Create patient** window, select the dataflow **Local Archive - Int. HD**.



Dataflow: Local Archive - Int. HD

Figure 4-17 Dataflow selection for backup

4.) Press **Config (F2)**.
5.) Select **Admin**.
6.) Select the **Backup** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat
Start backup
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Archive to backup	Result	Last successful
☑ Patient Archive	Success	13/08/2004
☑ System Configuration	Success	13/08/2004

Destination Device: 5 1/4 MO Disk (G:)

Remote Path:

Figure 4-18 The Backup tab

7.) In the **Backup** sheet select as needed:
   - **Patient Archive** to backup the patient records.
   - **System Configuration** to copy system settings and user presets.
8.) Select a removable media or a shared network folder as destination.

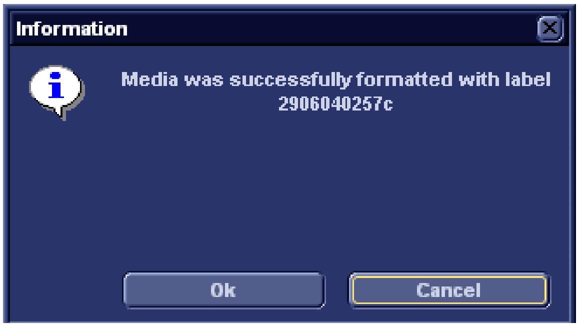
NOTE: *To be able to select a shared network folder, the path (of type:* ***\\server-name\share-name****) must be entered once in the* ***Remote Path*** *field.*

9.) If the backup is done to a removable media, insert a dedicated media in the drive.

4-2-12 Backup - Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

10.) Select **Start backup**. The following situations may occur:

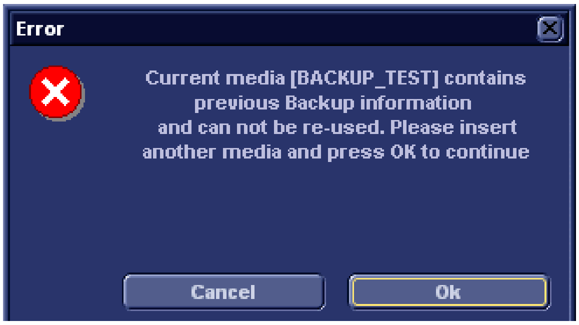
- The system is checking that the removable media is inserted. If not, a dialogue window is displayed prompting the user to insert a media.



Media was successfully formatted with label
2906040257c

Figure 4-19 The information window

- Insert the media and select **OK**.
- The system is checking if the media needs to be formatted. If yes, the media is automatically formatted. An Information window is displayed showing the media label.



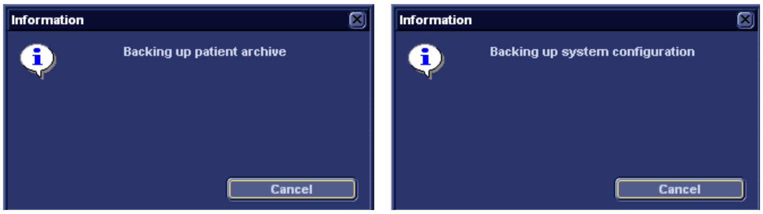
Current media [BACKUP_TEST] contains
previous Backup information
and can not be re-used. Please insert
another media and press OK to continue

Figure 4-20 The replace current media window

- Record the label and select **OK**.

4-2-12 Backup - Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

- The system is checking if there is already a backup or a Disk management copy on the media. If the following error message is displayed, the disk is ejected and the user is asked to use a new media that does not contain any backup or Disk management data.



Information

Backing up patient archive

Information

Backing up system configuration

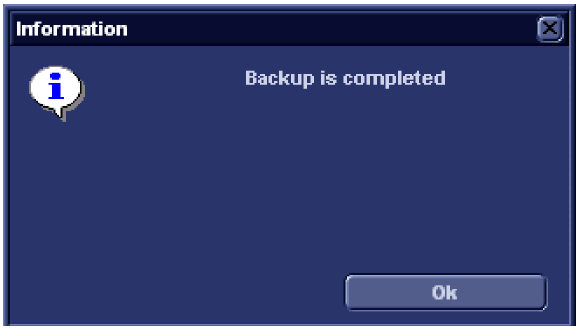
Figure 4-21 The backup progress windows

Insert a new media and select **OK**.

NOTE: To reuse a Backup media when performing a new archive backup, the media has to be re-formatted first.

11.) During backup, progress windows are displayed showing the current operation being performed.

12.) At the end of the process, the media is ejected and the **Backup completed** window is displayed.

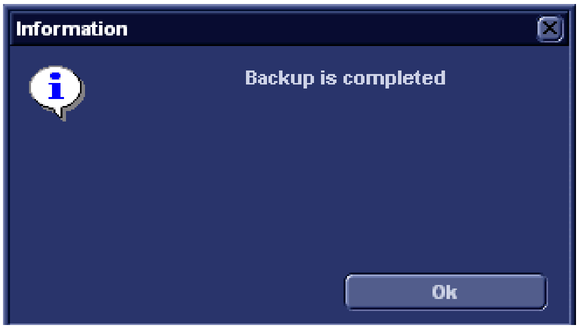


Information

Backup is completed

Figure 4-22 The backup completed window

13.) Select **OK**. The Backup result is displayed on the Backup sheet.



Information

Backup is completed

Figure 4-23 The backup result

14.) Make sure to physically label the media. An identification of the system should also be noted on the media and a backup log should be kept. File the media in a safe place.

4-2-13 Moving and Transporting the Vivid 7

CAUTION **VIVID 7 weighs 190 kg (419 lbs) or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed below could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

- **Be sure the pathway is clear.**
- **Use slow, careful motions.**
- **Use two people when moving on inclines or lifting more than 16 kg (35 lbs).**

WARNING ***PRIOR TO ELEVATING SCANNER, VERIFY THAT THE KEYBOARD IS LOCKED IN ITS LOWEST POSITION. VERIFY THAT THE FRONT BRAKE IS LOCKED AND THE SCANNER IS UNABLE TO SWIWEL. VERIFY THAT THE REAR BRAKES ARE IN THE LOCKED POSITION.***

WARNING ***WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.***

WARNING ***REMEMBER: IF THE FRONT CASTER SWIVEL LOCK IS ENGAGED FOR TRANSPORTATION, PRESSING THE RELEASE PEDAL ONCE DISENGAGES THE SWIVEL LOCK. YOU MUST DEPRESS THE RELEASE PEDAL A SECOND TIME TO ENGAGE THE BRAKE.***

WARNING ***THE SYSTEM SHOULD NOT BE MOVED WITH THE OPERATOR PANEL EXTENDED. MOVE THE OPERATOR PANEL TO ITS CENTERED AND LOCKED POSITION. LOWER THE OPERATOR PANEL AS MUCH AS POSSIBLE BEFORE MOVING THE SYSTEM.***

CAUTION **Ensure that nobody touch the console arm/frogleg when moving the Operator Panel (Control Console).**

CAUTION **Do not move the unit if the Operator Panel (Control Console) is in unlocked position.**

CAUTION **Always lock the Operator Panel (Control Console) in its parking (locked) position before moving the scanner around.**

CAUTION **To avoid injury when you move the LCD monitor and the monitor arm, do NOT put your finger, hand, or object on the joint of the monitor and the monitor arm.**

CAUTION **Before you move or transport the system, make sure to lock the LCD monitor firmly and flip down the monitor to prevent damage to the system.**

CAUTION **To avoid injury or damage to the monitor, make sure there is nothing within range of the LCD before moving the monitor and the monitor arm. This includes people as well as things.**

CAUTION **Do not transport Vivid 7 in a vehicle without locking the casters (wheels).**

4-2-13 Moving and Transporting the Vivid 7 (cont'd)

- Place the probes in their carrying case.
- Lock Operator Panel (Control Console) in place.
  The Operator Panel (Control Console) must be locked into the center (x/y) position as indicated on the label on the Front Handle, before transporting the system.

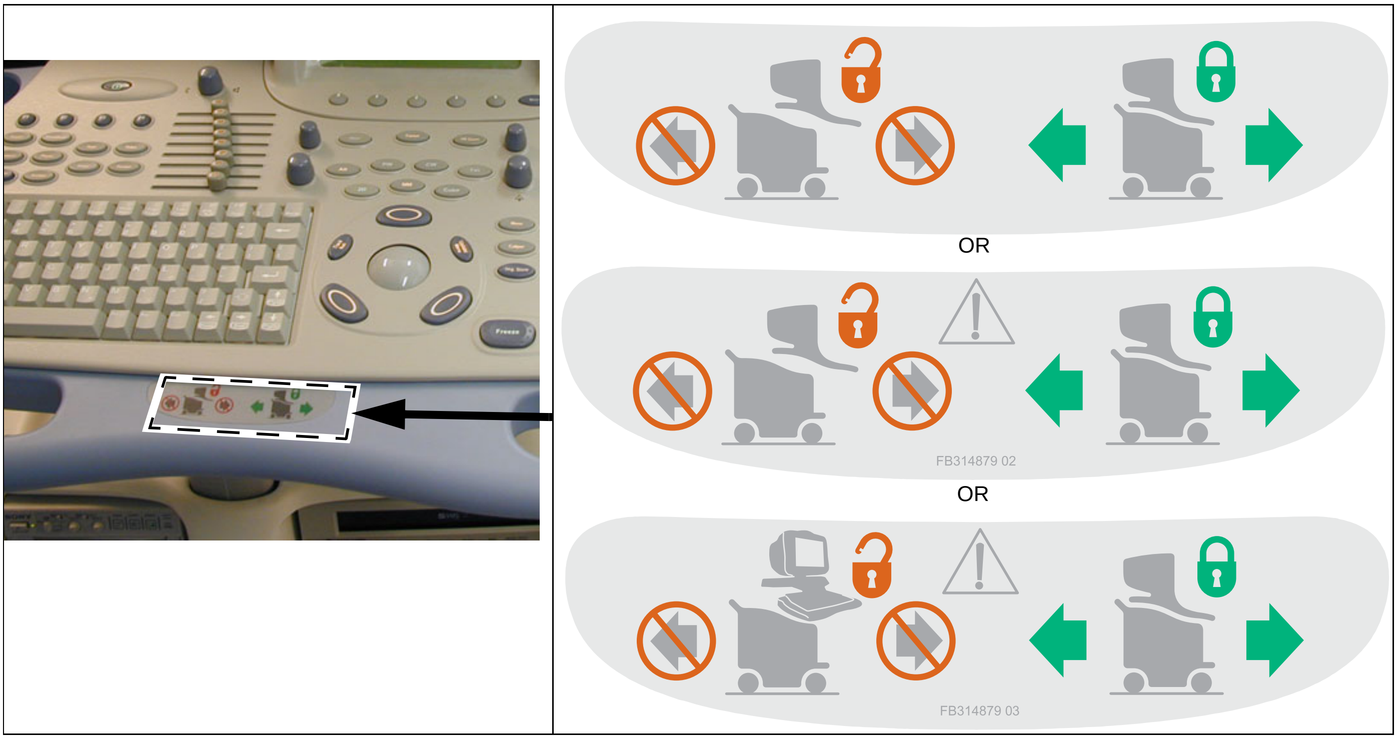


Figure 4-24 Label on Front Handle

- Eject any Magneto Optical disk, CD or DVD from their drive.
- Secure the unit in an upright position.
- Lock the casters (wheels) (brake)
- DO NOT use the Operator Panel (Control Console) as an anchor point.

NOTE: Special care should be taken when transporting the unit in a vehicle:

Please refer to the Vivid 7 Unpacking/Packing Procedure, Direction Number FC050172 - Section 4-3 "Loading and Transporting the Unit in a Van", if you need to transport the Vivid 7 by vehicle, and don't have the transportation cage available.

Section 4-3
Functional Checks

4-3-1 Overview

The intention with this section is to keep all functional checks together in one place.

4-3-2 Contents in this Section

Table 4-5 Functional Checks overview

SUBSECTION	DESCRIPTION	PAGE NUMBER
4-3-1	Overview	4-28
4-3-2	Contents in this Section	4-28
4-3-3	Preparation	4-28
4-3-4	Basic Controls	4-29
4-3-5	Performance Tests	4-31
4-3-6	2D Mode (B mode) Checks	4-32
4-3-7	M Mode Checks	4-39
4-3-8	Color Mode Checks	4-43
4-3-9	Doppler Mode Checks	4-49
4-3-10	4D Volume Rendering Test	4-55
4-3-11	Tissue Velocity Imaging (TVI) Checks	4-57
4-3-12	Contrast Checks	4-63
4-3-13	Stress Echo	4-63
4-3-14	Measurements and Multi Image Checks	4-64
4-3-15	Multi Image Checks	4-66
4-3-16	Probe/Connectors Check	4-67
4-3-17	ECG Check	4-68
4-3-18	Cineloop Check	4-69
4-3-19	Back-End Processor Checks	4-73
4-3-20	Peripheral Checks	4-74
4-3-21	Mechanical Functions Checks	4-78

4-3-3 Preparation

Turn on power to Vivid 7, see 4-2-2 - Power ON/ Boot UP on page 4-3.

4-3-4 Basic Controls

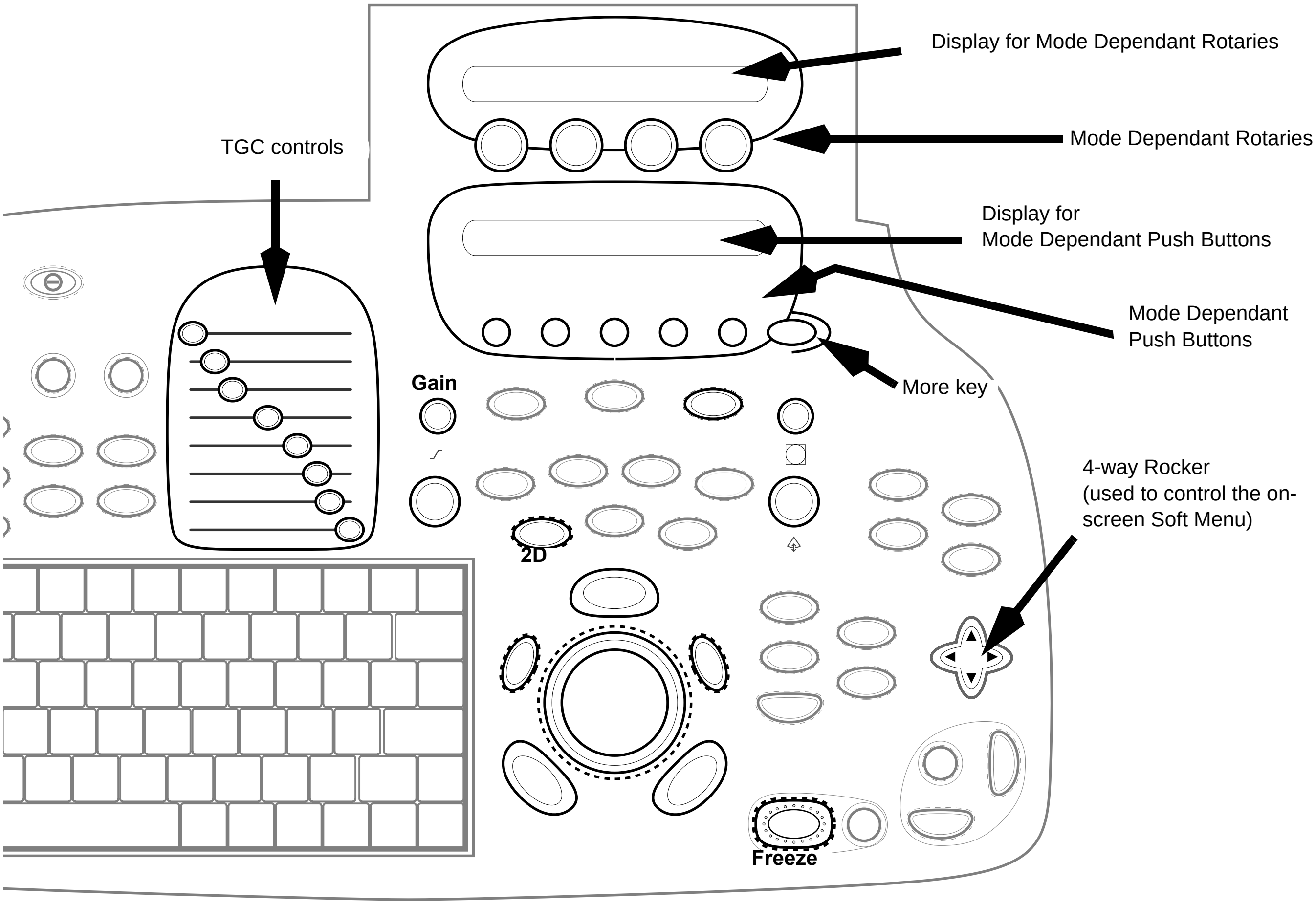

Display for Mode Dependant Rotaries
Mode Dependant Rotaries
TGC controls
Display for
Mode Dependant Push Buttons
Mode Dependant
Push Buttons
More key
Gain
4-way Rocker
(used to control the on-screen Soft Menu)
2D
Freeze

Figure 4-25 2D Mode, 2D Freeze and Cine Replay Controls

4-3-4-1 Introduction

Most of the mode dependant controls can be found as Mode Dependant Keys (Mode Dependant Rotary Knobs and Mode Dependant Push Buttons) and Trackball. The functions available on the Mode Dependant Keys and Trackball vary according to the scan mode and position that is currently active.

4-3-4-2 Mode Dependant Rotary Knobs

Vivid 7 has four mode dependant rotary knobs. The assigned functions are indicated above the rotary on the LCD display.

4-3-4-3 Mode Dependant Push Buttons

Vivid 7 has five Mode Dependant Push Buttons. The assigned functions are indicated above the button on the LCD display.

4-3-4-4 More

The **MORE** button gives access to additional controls on the Mode Dependant Push Buttons.

4-3-4-5 Soft Menu Control (4-way Rocker)

The 4-way Rocker works together with the Soft menu on the screen.

- The vertical arrows (up/down) are used to do selections from the Soft Menu.
- The horizontal arrows (left/right) are used to do adjustments on the selected function.

4-3-4-6 Trackball Area

Different functions can be assigned to the trackball depending of the current active mode. The Trackball area consist of:

- The Trackball: used as a cursor control in acquisition mode, scrolling control in freeze and as a selection tool (like a mouse cursor) in post-processing mode.
- Three **SELECT** keys (identical): Perform the selected control or highlighted menu item.
- The **TRACKBALL** key: Toggles between the available trackball function assignments displayed in the Status bar.
- The update menu key: enables quick access to image related functions from a pop-up menu.

4-3-4-7 Other Controls

Other controls are located on separate keys (knobs and buttons) or groups of keys on the Operator Panel.

4-3-5 Performance Tests

4-3-5-1 Recommended Test Phantoms

GE Healthcare recommends the RMI 430GS phantom. It is the most current phantom recommended to our field service personnel and provides the necessary targets and extended life necessary for consistent system testing.

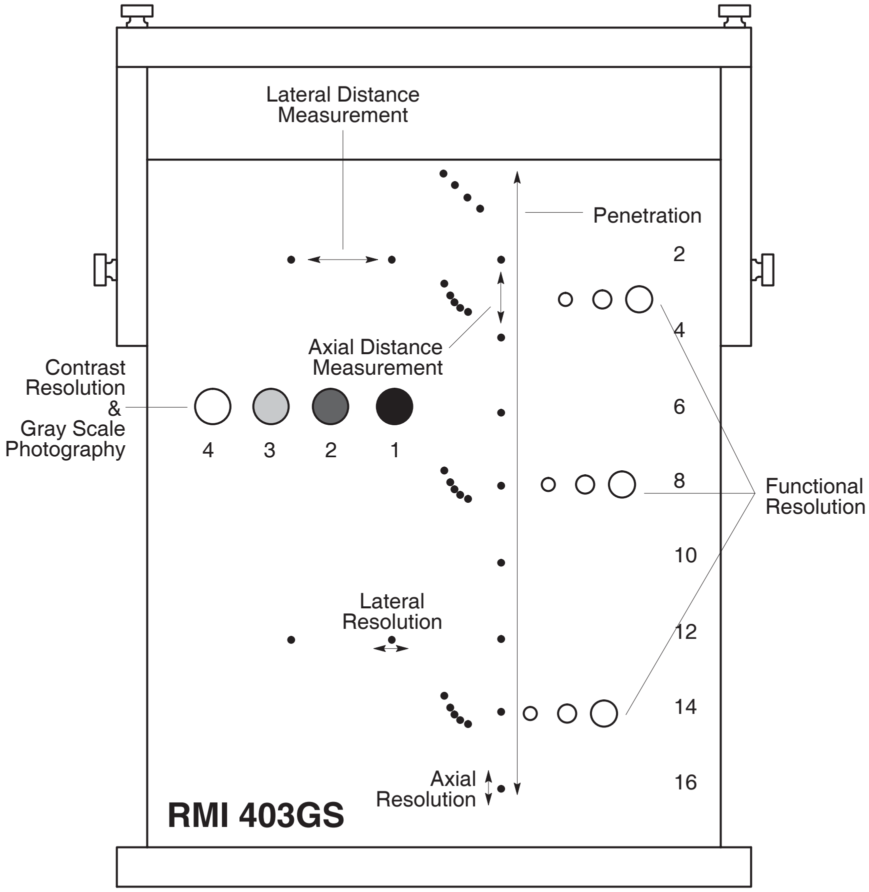

Lateral Distance Measurement
Penetration
2
4
Axial Distance Measurement
Contrast Resolution & Gray Scale Photography
4
3
2
1
6
8
Functional Resolution
10
Lateral Resolution
12
14
Axial Resolution
16
RMI 403GS

Figure 4-26 Performance tests

4-3-6 2D Mode (B mode) Checks

4-3-6-1 Introduction

The 2D Mode is the system’s default mode.

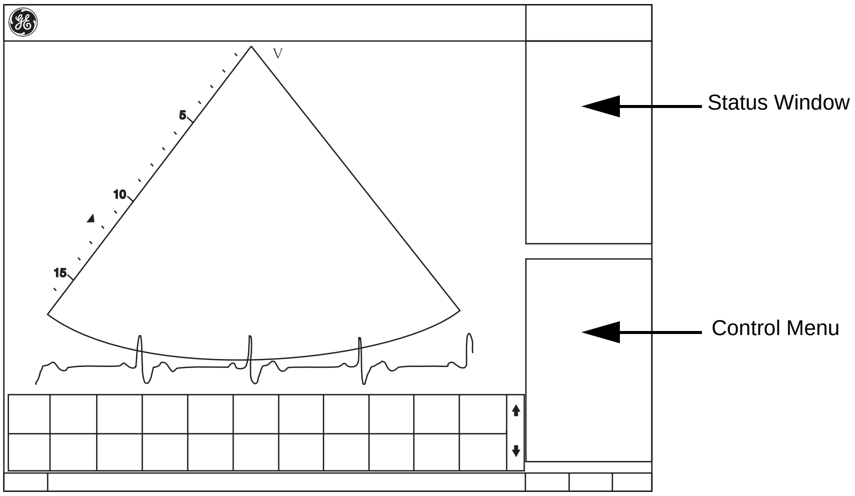


Figure 4-27 2D Mode Screen Example

4-3-6-2 Preparations

Use a phantom when doing these tests.

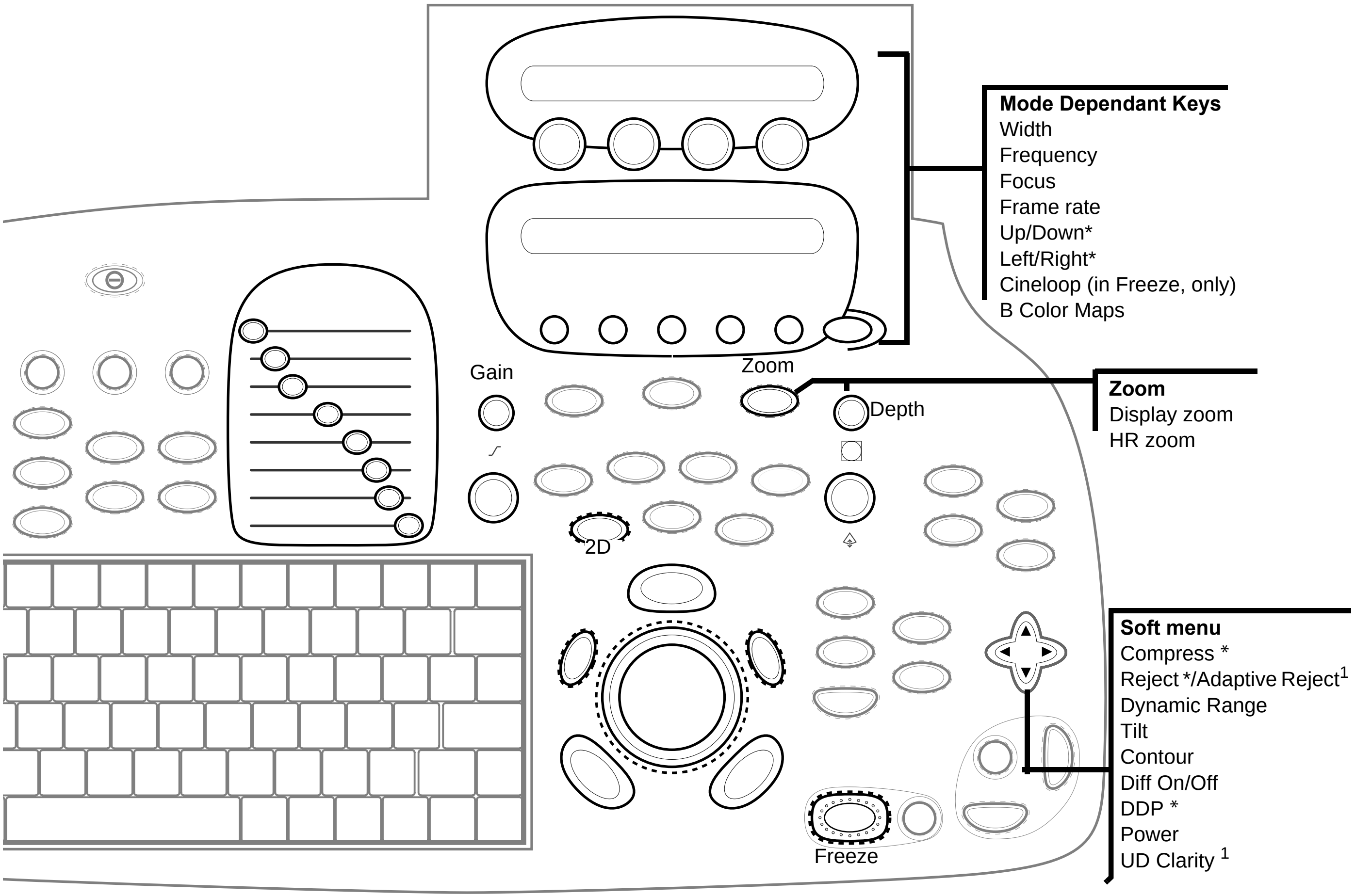
1.) Connect one of the probes, to the scanner’s left-most active probe connector.
  - See "Probe Connection" on page 3-21 for info about connecting the probes.
  - See section Section 9-26 "Probes" on page 9-80 for available probes.

2.) Turn ON the scanner.
  - See 4-2-2 "Power ON/ Boot UP" on page 4-3 for info about booting the scanner.

  The 2D Mode window is displayed (default mode).

3.) If needed, adjust the Display’s Brightness and Contrast setting.

4-3-6-2 Preparations (cont'd)


Mode Dependant Keys
Width
Frequency
Focus
Frame rate
Up/Down*
Left/Right*
Cineloop (in Freeze, only)
B Color Maps
Gain
Zoom
Depth
Zoom
Display zoom
HR zoom
2D
Soft menu
Compress *
Reject */Adaptive Reject[1]
Dynamic Range
Tilt
Contour
Diff On/Off
DDP *
Power
UD Clarity [1]
Freeze

Controls marked with * in the illustration are also available in Freeze and Cine Replay.
Controls marked with [1] in the illustration are used for Cardiac Probes in software version v7.0 and newer.

Figure 4-28 Mode Dependent Keys, Zoom and Soft Menu Key

⚠ **WARNING** ***Always use the minimum power required to obtain acceptable images in accordance with applicable guidelines and policies.***

4.) Press **2D** on the Operator Panel to access 2D Mode.

5.) These Image Controls are used to optimize the 2D picture:

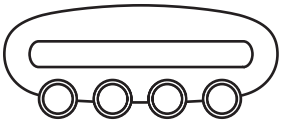
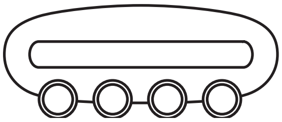
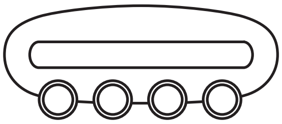
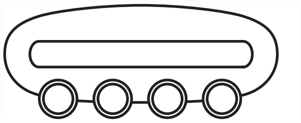
- Use **Gain** and **TGC** controls to optimize the overall image together with the **Power** control.
- Use **Depth** to adjust the range to be imaged.
- Use **Focus** to center the focal point(s) around the region of interest.
- Use **Frequency** (move to higher frequencies) or **Frame rate** (move to lower frame rate) to increase resolution in image.
- Use **Frequency** (move to lower frequency) to increase penetration.
- Use the **DDP** control to optimize imaging in the blood flow regions and make a cleaner, less noisy image.
- Use **Reject/Adaptive Reject** controls to reduce noise in the image.
- Use the **UD Clarity** control to personalized appearance of the tissue. Moving the paddle to the left creates a smoother image, though keeping boundaries sharp. Moving the paddle to the right creates a crisper image.

4-3-6-3 Check Width, Focus, Framerate, Frequency

These 2D Mode Functions are located on Mode Dependant Rotaries.

The results of these adjustments must be verified on the 2D sector on the screen.

Table 4-6 2D Mode: Check Width, Focus, Framerate and Frequency

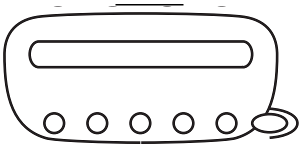
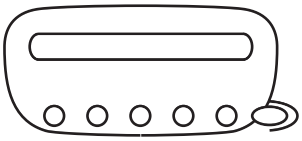
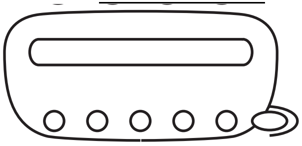
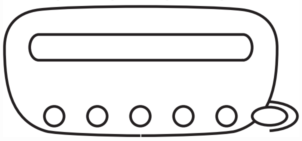
Step	Task	Expected Result
1.	Turn the rotary labeled **WIDTH** left and right. 	Controls the size or angular width of the 2D image sector. A smaller angle generally produces a scan with higher frame rate.
2.	Turn the rotary labeled **FOCUS** left and right to move the focal point up and down. 	Changes the location of the focal point(s). A triangular focus marker indicates the depth of the focal point.
3.	Turn the rotary labeled **FRAMERATE** left and right to adjust the Frame Rate 	Adjusts frame rate. Rotate the knob clockwise to increase frame rate. The relative setting of the frame rate is displayed in the status window. When adjusting frame rate, there is a trade off between spatial and temporal resolution.
4.	Turn the rotary labeled **FREQUENCY** left and right to verify that the probe's operating frequency can be adjusted 	Enables the adjustment of the probe's operating frequency. Rotate the knob clockwise to increase the frequency. The selected frequency is displayed in the status window. For some probes/applications, the lowest frequency settings will be Octave Imaging settings.

4-3-6-4 Check Up/Down, Left/Right, B Color Maps and Cineloop

These 2D Mode Functions are located on Mode Dependant Keys (Push Buttons)

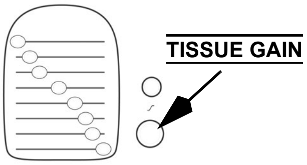
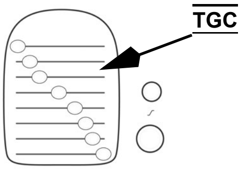
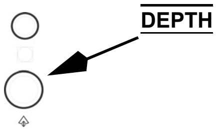
The results of these adjustments must be verified on the 2D sector on the screen.

Table 4-7 2D Mode: Check Up/Down, Left/Right, B Color Maps and Cineloop

Step	Task	Expected Result
1.	Press once on the Mode Dependant button labeled **UP/DOWN** 	Enables the 2D image to be flipped 180 degrees.
2.	Press once on the Mode Dependant button labeled **LEFT/RIGHT** 	Enables a mirror image of the 2D image to be created. The left/right reference marker **V** moves to the other side of the image.
3.	Select **B COLOR MAPS** 	Displays a 2D Map Menu on the screen to optimize the greyscale presentation. The menu enables an option from a list of non-linear gray-curves or different 2D-colorized curves to be selected.
4.	Press **FREEZE** Select **CINELOOP**) 	Starts cine loop acquisition.

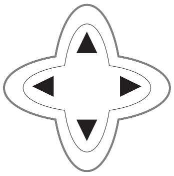
4-3-6-5 Check Gain, TGC and Depth

Table 4-8 2D Mode: Check Gain, TGC and Depth in 2D Mode

Step	Task	Expected Result
1.	Adjust **TISSUE GAIN** 	Increases the overall gain equally for all depth when rotated clockwise
2.	Adjust Time Gain Compensation (TGC) 	Compensates for depth-related attenuation in an image. The upper sliders affect the near field. The lower sliders (nearest the operator) affect the far field.
3.	Adjust Depth 	Sets the maximum (far field) distance that will be imaged. Decreasing the depth may allow higher frame rates

4-3-6-6 2D Soft Menu Controls

Table 4-9 4-way rocker used for Soft Menu control

KEY	DESCRIPTION
	A 4-way rocker (4-way multi direction switch) used to; - access mode-specific menus on the screen. - select a menu option. - adjust option-related values. When using the Rocker; - the vertical arrows are used to select the menu options. - the horizontal arrows are used to adjust the values.

4-3-6-7 Check Compress, Contour, Reject and Tilt

Table 4-10 2D Mode: Check Compress, Contour, Reject and Tilt

Step	Task	Expected Result(s)
1.	Use the vertical arrows to select Compress. Use the horizontal arrows to adjust Compress.	Compress controls the amount of contrast in the 2D image. An index number is displayed in the status window to indicate the relative level of compression.
2.	Use the vertical arrows to select Contour. Use the horizontal arrows to adjust Contour.	Contour controls image processing related to the extent of edge enhancement applied to an image.
3.	Use the vertical arrows to select Reject. Use the horizontal arrows to adjust Reject.	When Reject is increased, low-level echoes and noise are rejected and appear darker in the 2D image. An index number is displayed in the status window to indicate the relative level of rejection.
4.	Use the vertical arrows to select Tilt. Use the horizontal arrows to adjust Tilt.	Tilts the axis of the 2D image to the left or right. By using this control in combination with Angle control, the image can be “aligned” to the direction of interest, and frame rates be optimized. By default the axis of symmetry of a 2D image is vertical.

4-3-6-8 Check DDP, Diff, Power and Dynamic Range

Table 4-11 2D Mode: Check DDP, Diff, Power and Dynamic Range

Step	Task	Expected Result(s)
1.	Use the vertical arrows to select DDP (Data Dependent Processing). Use the horizontal arrows to adjust DDP.	Performs temporal processing which reduces random noise without affecting the motion of significant tissue structures. An index number is displayed in the status window (under Proc) to indicate the relative DDP level.
2.	Use the vertical arrows to select Diff. Use the horizontal arrows to turn Diff On/Off.	Affects the level of reverberations in the image. When turned ON, the frame rate (or the number of focal zones) will decrease, while the reverberations will be attenuated.
3.	Use the vertical arrows to select Power. Use the horizontal arrows to adjust Power.	Controls the amount of acoustic power applied in all modes. When power is set to maximum, it is equal to or less than the maximum acoustic power permitted by the FDA. The Thermal Index (TI) and the Mechanical Index (MI) are displayed on the screen.
4.	Use the vertical arrows to select Dynamic Range. Use the horizontal arrows to adjust Dynamic Range.	Enables control of the dynamic range or contrast of the image. When Dynamic Range is set high, the image is softer and more low-level data is visible.

4-3-7 M Mode Checks

4-3-7-1 Introduction

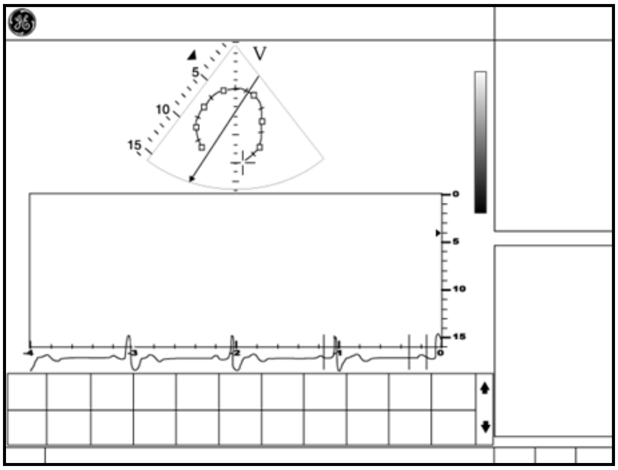


Figure 4-29 M-Mode Screen Example

4-3-7-2 Preparations

Use a phantom when doing these tests.

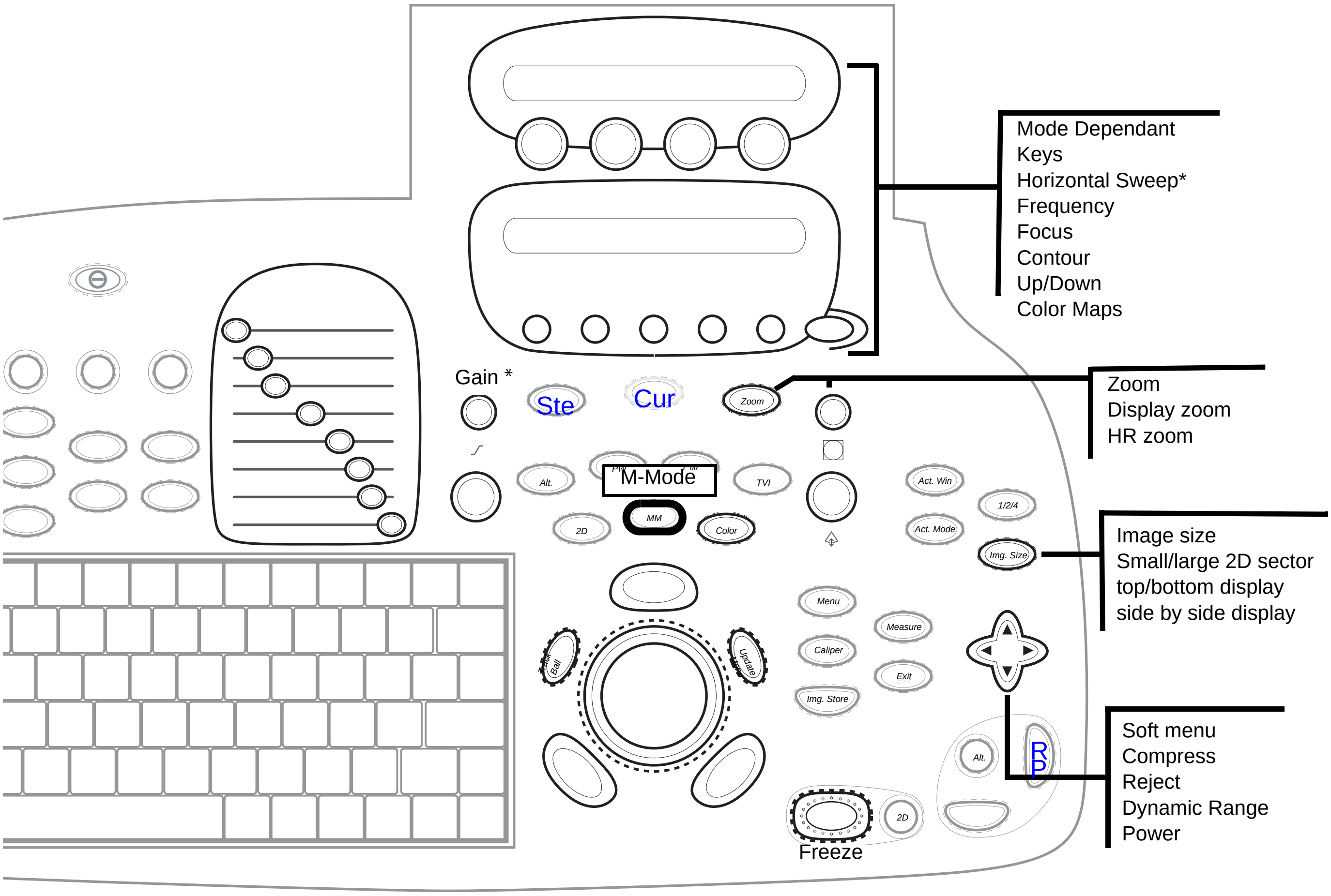
1.) Connect one of the probes, to the scanner's left-most probe connector.
  - See 3-6-5 "Probe Connection" on page 3-21 for info about connecting the probes.
  - See Section 9-26 "Probes" on page 9-80 for available probes.

2.) Turn ON the scanner.
  - See see 4-2-2 "Power ON/ Boot UP" on page 4-3 for info about booting the scanner.

The 2D Mode window is displayed (default mode).

3.) Press **M-MODE** to bring up an M-Mode picture on the screen.

4-3-7-2 Preparations (cont'd)


Gain *
Ste
Cur
Zoom
Alt.
PW
CW
M-Mode
TVI
Act. Win
1/2/4
2D
MM
Color
Act. Mode
Img. Size
Menu
Measure
Caliper
Exit
Img. Store
Ball
Update
Alt.
R
P
2D
Freeze

Mode Dependant
Keys
Horizontal Sweep*
Frequency
Focus
Contour
Up/Down
Color Maps

Zoom
Display zoom
HR zoom

Image size
Small/large 2D sector
top/bottom display
side by side display

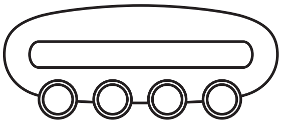
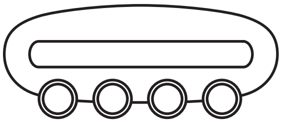
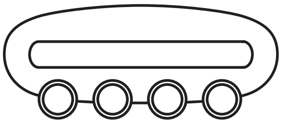
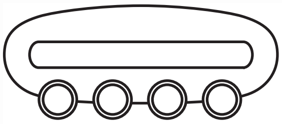
Soft menu
Compress
Reject
Dynamic Range
Power

Controls marked with * are also available in freeze and cine replay

Figure 4-30 M Mode, Freeze and Cine Replay controls

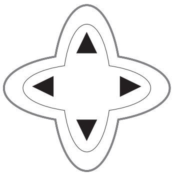
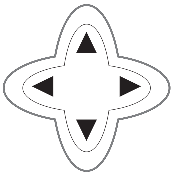
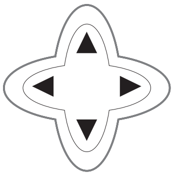
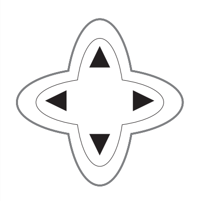
4-3-7-3 Check Horizontal Sweep, Frequency, Focus and Contour

Table 4-12 M-Mode: Check Horizontal Sweep, Frequency, Focus and Contour

Step	Task	Expected Result(s)
1.	Adjust **HORIZONTAL SWEEP** 	Adjusts the horizontal refresh rate of the M-Mode area of the display. Horizontal sweep does not change the acquisition resolution, so you can change the horizontal sweep in replay without any loss of quality.
2.	Adjust **FREQUENCY** Rotate the knob clockwise to increase the probe's operating frequency. 	The probe's operating frequency is increased. The selected frequency is displayed in the status window. For some probes/applications the lowest frequency settings will be Octave imaging settings.
3.	Adjust **FOCUS** 	Changes the location of the focal point(s). A triangular focus marker indicates the depth of the focal point.
4.	Adjust **CONTOUR** 	Controls image processing related to the extent of edge enhancement applied to an image.

4-3-7-4 Check Compress, Reject, Power and Dynamic Range

Table 4-13 M-Mode Soft menu Controls check

Step	Task	Expected Result(s)
1.	Adjust Compress 	Controls the amount of contrast in the image. An index number is displayed in the status window to indicate the relative level of compression.
2.	Adjust Reject 	Adjust reject level. When Reject is increased, low-level echoes are rejected and appear darker in the image. An index number in the status window indicates the relative level of rejection.
3.	Adjust Power 	Controls acoustic power in all modes. When power is set to maximum, it is equal to or less than the maximum acoustic power permitted by the FDA. Both Thermal Index (TI) and Mechanical Index (MI) are displayed on the screen.
4.	Adjust Dynamic Range 	Enables control of the dynamic range or contrast of the image. When dynamic range is set to High, the image is softer and more low-level data is visible.

4-3-8 Color Mode Checks

4-3-8-1 Introduction

Color Flow screens is 2D or M Mode screens with colors representing blood or tissue movement.

Color Flow may be selected both from 2D mode or from M mode or a combination of these.

4-3-8-2 Preparations

Use a phantom when doing these tests.

1.) Connect one of the probes, to the scanner's left-most probe connector.
    - See *"Probe Connection" on page 3-21* for info about connecting the probes.
    - See *Chapter 9 -* , section *9-26* for available probes.
2.) Turn ON the scanner.
    - See 4-2-2 - Power ON/ Boot UP on page 4-3 for info about booting the scanner

    The 2D Mode window is displayed (default mode).

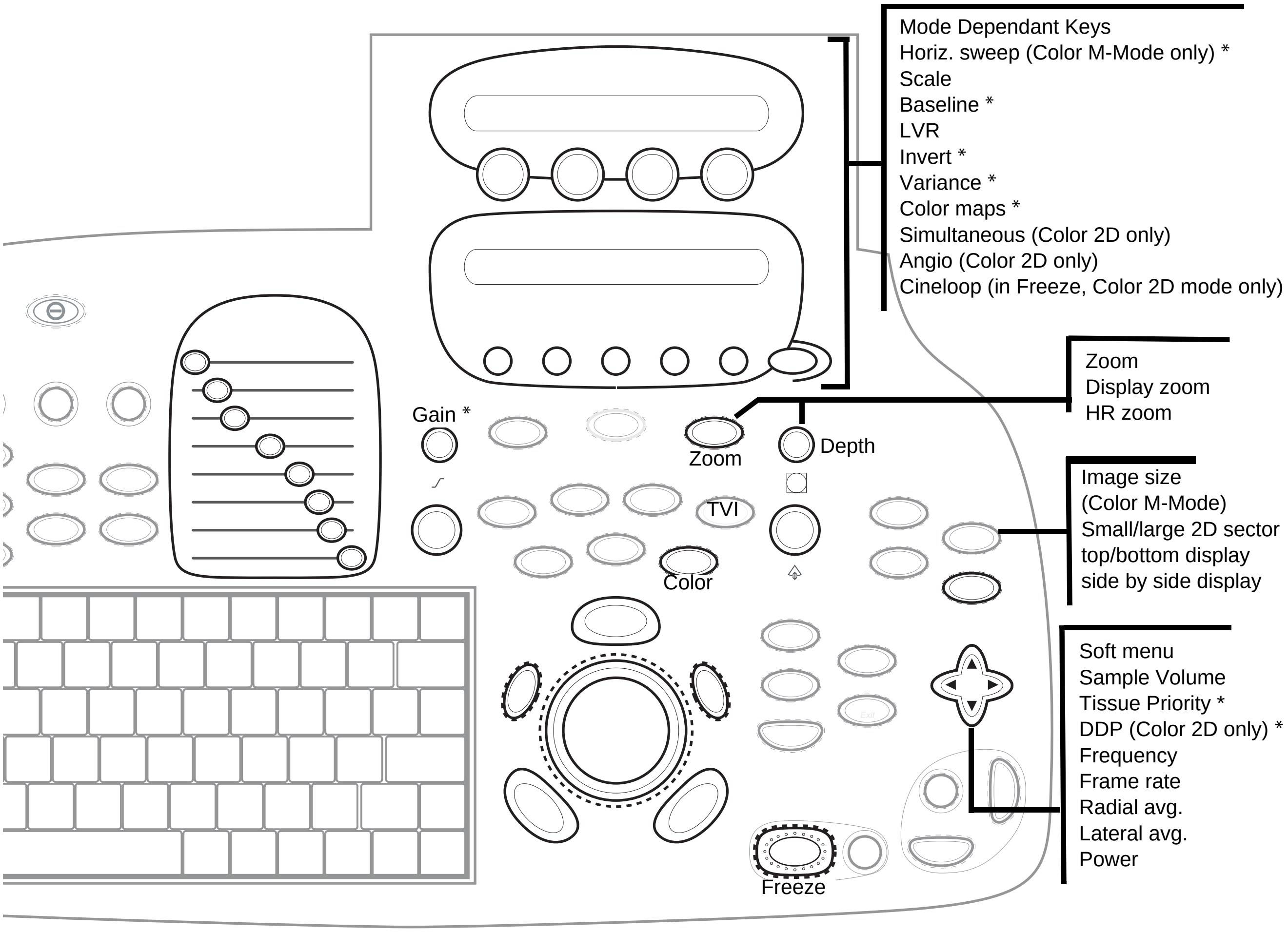
4-3-8-3 Color 2D Mode

Press **COLOR**.

4-3-8-4 Color M Mode

1.) Press **MM** (M Mode) to bring up an M Mode display on the screen.
2.) Press **COLOR**.

4-3-8-4 Color M Mode (cont'd)

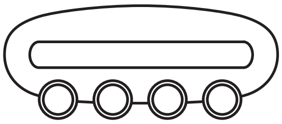
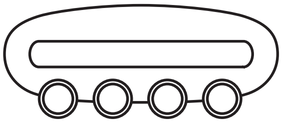
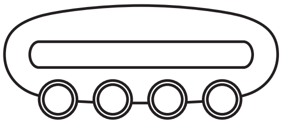
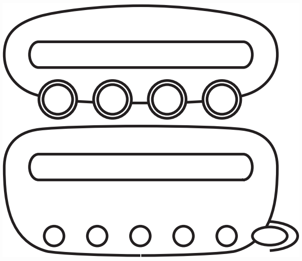
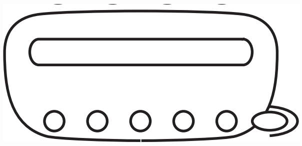

Mode Dependant Keys
Horiz. sweep (Color M-Mode only) *
Scale
Baseline *
LVR
Invert *
Variance *
Color maps *
Simultaneous (Color 2D only)
Angio (Color 2D only)
Cineloop (in Freeze, Color 2D mode only)
Zoom
Display zoom
HR zoom
Gain *
Zoom
Depth
TVI
Color
Image size
(Color M-Mode)
Small/large 2D sector
top/bottom display
side by side display
Soft menu
Sample Volume
Tissue Priority *
DDP (Color 2D only) *
Frequency
Frame rate
Radial avg.
Lateral avg.
Power
Freeze

Controls marked with * are also available in freeze and cine replay

Figure 4-31 Color Flow Mode Controls

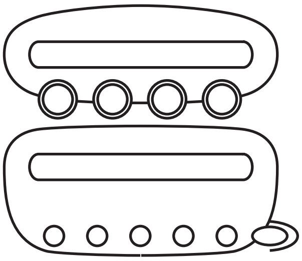
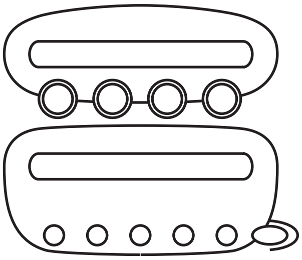
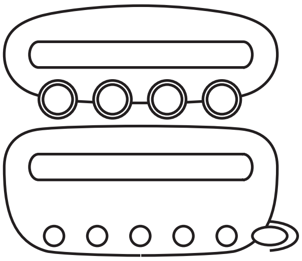
4-3-8-5 Check Horizontal Sweep, PRF, Baseline, LVR and Invert

Table 4-14 Color Flow Mode Controls Check

Step	Task	Expected Result(s)
1.	Adjust Horizontal Sweep (Color M-Mode only) 	Adjusts the horizontal refresh rate of the M-Mode area of the display.
2.	Adjust Baseline 	Adjusts the color map to emphasize flow either toward or away from the probe. Baseline is available in both Live and Freeze.
3.	Change PRF (Pulse Repetition Frequency) 	Adjusts the repetition rate of the Doppler pulses transmitted to acquire the data for color flow mapping. The PRF (Nyquist limit) should be adjusted so that no aliasing occur, while still having a good resolution of velocities, meaning the Nyquist limit should be somewhat above the maximum velocity found in the data.
4.	Adjust LVR (Low Velocity Rejection 	LVR, also called Wall Motion Filter, enables the extent of low velocity removal to be adjusted.
5.	Invert 	Enables the color scheme assigned to positive and negative velocities to be inverted. Invert is available in live and Cine Replay.

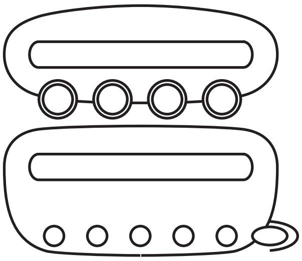
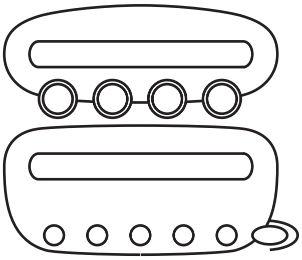
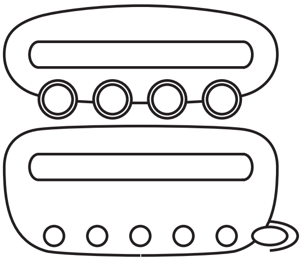
4-3-8-6 Check Variance, Color Maps and Cineloop

Table 4-15 Color Flow Mode: Check Variance, Color Maps and Cineloop

Step	Task	Expected Result(s)
6.	Adjust Variance 	Controls the amount of variance data added to a color display. Variance enables computer-aided detection of non-luminary flow (e.g. jets or regurgitation). Variance is available in live and cine replay.
7.	Select Color Maps 	Displays a menu of color map options. Use the trackball to point to a color map and press **SELECT** to activate the desired color map. Each color map is assigning different color hues to different velocities.
8.	Make Cineloop (in Freeze, Color 2D mode only) 	Starts cine loop acquisition.

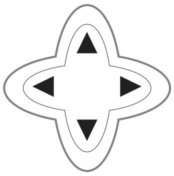
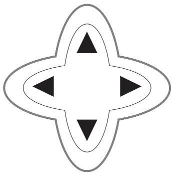
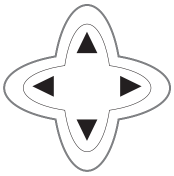
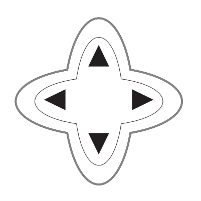
4-3-8-7 Check Sample Volume and Tissue Priority

Table 4-16 Color Flow Mode: Check Variance, Color Maps and Cineloop

Step	Task	Expected Result(s)
9.	Adjust Variance 	Controls the amount of variance data added to a color display. Variance enables computer-aided detection of non-luminary flow (e.g. jets or regurgitation). Variance is available in live and cine replay.
10.	Select Color Maps 	Displays a menu of color map options. Use the trackball to point to a color map and press **SELECT** to activate the desired color map. Each color map is assigning different color hues to different velocities.
11.	Make Cineloop (in Freeze, Color 2D mode only) 	Starts cine loop acquisition.

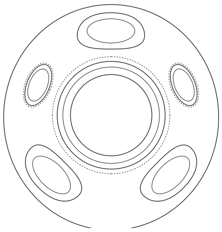
4-3-8-8 Check Frequency, Radial Averaging, Lateral Averaging, Power

Table 4-17 Color-Mode Soft Menu Controls Check

Step	Task	Expected Result(s)
1.	Adjust Frequency 	Enables the adjustment of the transmission frequency to control the sensitivity or the level of penetration. The selected frequency is displayed in the status window. Adjusting Frequency may affect Sample Volume and LVR settings.
2.	Adjust Radial Averaging 	Smooths the image by averaging collected data along the same radial line. An increase of the radial averaging will reduce noise, but this will also reduce the radial resolution.
3.	Adjust Lateral Averaging (Color 2D only) 	Smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.
4.	Adjust Power 	Controls the amount of acoustic power applied in all modes. When power is set to maximum, it is equal to or less than the maximum acoustic power permitted by the FDA. The Thermal Index (TI) and the Mechanical Index (MI) are displayed on the screen.

4-3-8-9 Adjust ROI

Table 4-18 Adjust ROI

Step	Task	Expected Result(s)
1.	Adjust Sample volume 	Adjusts the size of the color flow Doppler sampling area. Lower setting gives better flow resolution while a higher setting increases sensitivity and helps to locate disturbed flows.

4-3-9 Doppler Mode Checks

4-3-9-1 Introduction

Doppler is used to measure velocity (most often in blood).

Doppler mode can be done with a special pencil probe or with an ordinary probe. By using an ordinary probe, you can first bring up a 2D picture for navigation purpose and then add Doppler.

4-3-9-2 Preparations

Use a phantom when doing these tests.

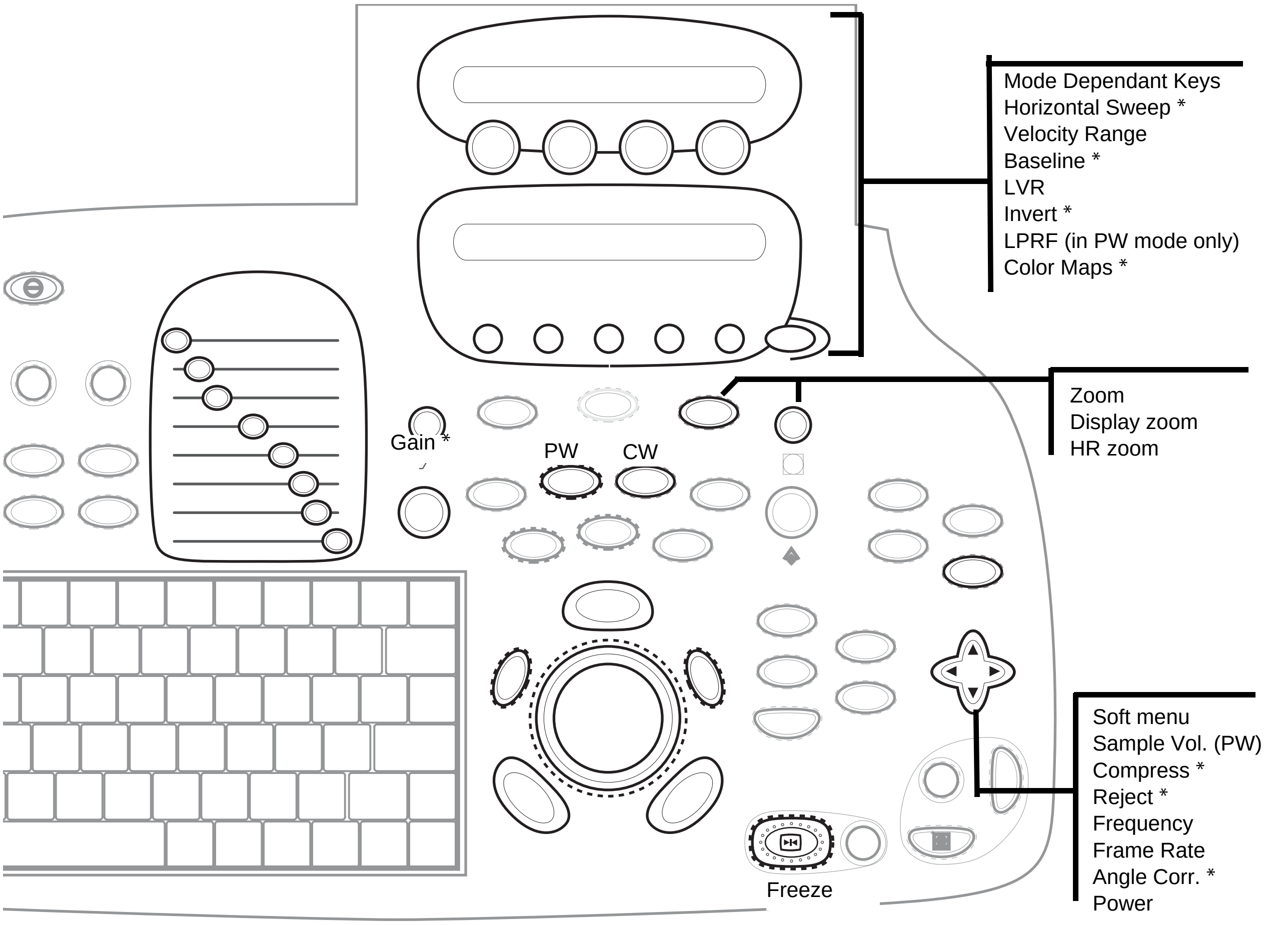
1.) Connect one of the probes, to the scanner's left-most probe connector.
  - See *Probe Connection*, page *3-21* for info about connecting the probes
  - See *Section 9-26 "Probes" on page 9-80* for available probes

2.) Turn ON the scanner
  - See 4-2-2 - Power ON/ Boot UP on page 4-3 for info about booting the scanner.

  The 2D Mode window is displayed (default mode).

3.) If needed, adjust the Display's Brightness and Contrast setting.
4.) Press PW or CW to start Pulsed Wave Doppler (PW) or Continuous Wave Doppler (CW).
5.) Use the trackball to select the Area of Interest (Sample Volume) in PW or direction of interest in CW.

4-3-9-2 Preparations (cont'd)

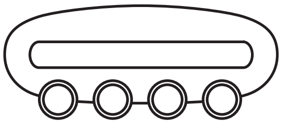
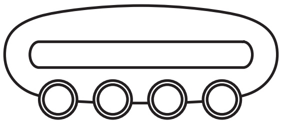
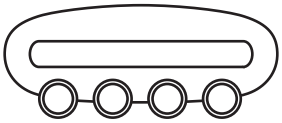
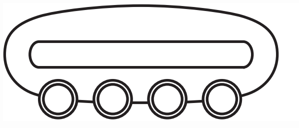

Mode Dependant Keys
Horizontal Sweep *
Velocity Range
Baseline *
LVR
Invert *
LPRF (in PW mode only)
Color Maps *
Zoom
Display zoom
HR zoom
Gain *
PW
CW
Soft menu
Sample Vol. (PW)
Compress *
Reject *
Frequency
Frame Rate
Angle Corr. *
Power
Freeze

Controls marked with * (asterisk) are also available in freeze and cine replay

Figure 4-32 Doppler Mode Controls

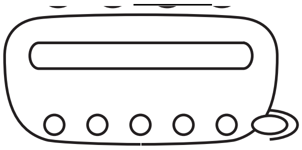
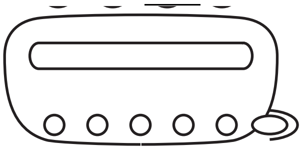
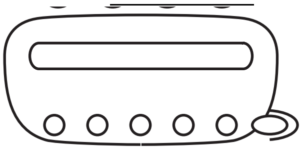
4-3-9-3 Check Horizontal Sweep, Velocity Range, Baseline and Low Velocity Reject

Table 4-19 Doppler Mode Controls Checks

Step	Task	Expected Result(s)
1.	Adjust **HORIZONTAL SWEEP** 	Adjusts the horizontal refresh rate of the Doppler area of the display. Horizontal sweep is available in live and cine replay.
2.	Adjust **VELOCITY RANGE** 	Enables the vertical scale of the Doppler spectrum and the maximal detectable velocity to be modified. Velocity range directly controls the pulse repetition frequency, which is responsible for the setting of the Nyquist limit (the ability to detect maximal velocity without aliasing).
3.	Move **BASELINE** 	Enables the Doppler baseline to be shifted up and down. The default Doppler baseline is set at the center of the vertical aspect of the Doppler display, dividing evenly the flow toward and away from the probe. By adjusting the baseline a larger portion of the analysis is assigned to the flow direction present. Baseline is available in live and cine replay.
4.	Adjust Low Velocity Reject (**LV REJ**.) 	Enables the low velocity portions of the spectrum to be filtered, since the Doppler spectrum and audio may contain strong wall-motion signals. The amount of LV Rej. is indicated by the green vertical bar at the right end of the baseline.

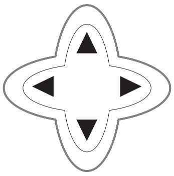
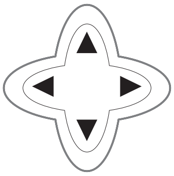
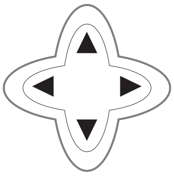
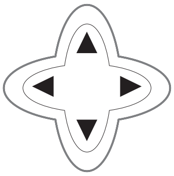
4-3-9-4 Check Invert, LPRF (in PW only) and Color Maps

Table 4-20 Doppler Mode Controls Checks

Step	Task	Expected Result(s)
5.	Press **INVERT** 	Enables the Doppler spectrum to be flipped 180 degrees, so that negative velocities are displayed above the baseline and positive velocities below the baseline. Invert is available in live and cine replay.
6.	Press **LPRF** 	In PW, adjusts the pulse repetition frequency for the PW Doppler acquisition of data flow.
7.	Choose **COLOR MAPS** 	Displays a drop down menu of different Doppler colorization maps. Use the trackball to select the desired map and press Select to activate the map.

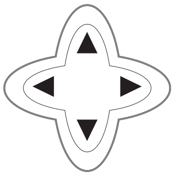
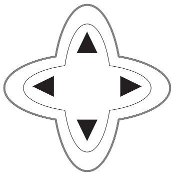
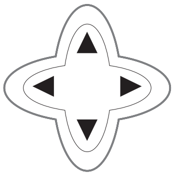
4-3-9-5 Check Sample Volume, Compress, Reject and Frequency

Table 4-21 PW/CW Doppler Mode: Check Sample Volume, Compress, Reject and Frequency

Step	Task	Expected Result(s)
1.	Adjust **SAMPLE VOLUME** (SV) 	In PW mode, set the longitudinal size of the region to be sampled for measurement. Adjusting Sample volume may affect the PRF (Nyquist limit) settings. SV does not apply to CW mode, where the volume sampled is the full length of the area indicated by the cursor line.
2.	Change **COMPRESS** 	Enables control over the contrast of the Doppler spectrum. When compression is raised, the spectrum image becomes softer and some low level background noise may appear. Compress is available in both Live and Freeze.
3.	Adjust **REJECT** 	Enables undesirable background noise to be removed from the Doppler spectrum resulting in a darker background. Reject is available in both Live and Freeze.
4.	Change **FREQUENCY** 	Adjusts the transmission frequency in Doppler to control sensitivity or level of penetration. The selected frequency is displayed in the status window. Adjusting Frequency may affect Sample Volume (PW) and LVR settings.

4-3-9-6 Check Frame Rate, Angle Correction and Power

Table 4-22 PW/CW Doppler Mode: Check Frame Rate, Angle Correction and Power

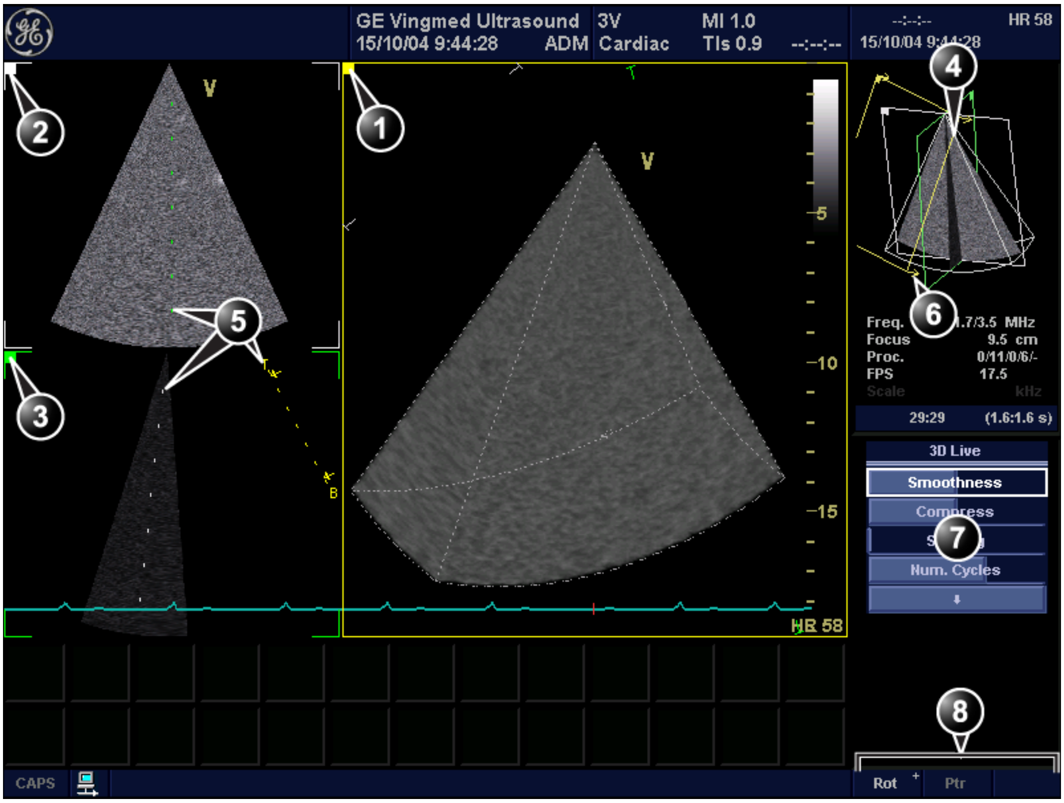
Step	Task	Expected Result(s)
1.	Adjust **FRAME RATE** 	Adjusts frame rate. The relative setting of the frame rate is displayed in the status window (under 2D).
2.	Adjust **ANGLE CORRECTION** 	Enables correction of the Doppler velocity scale by defining the angle between the Doppler beam and the investigated blood vessel. A thin cross bar on the Doppler cursor will rotate as the control is adjusted. Angle correction is available in both Live and Freeze.
3.	Adjust **POWER** 	Controls the amount of acoustic power applied in all modes. When power is set to maximum, it is equal to or less than the maximum acoustic power permitted by the FDA. The Thermal Index (TI) and the Mechanical Index (MI) are displayed on the screen.

4-3-10 4D Volume Rendering Test

Do a 4D functional check. The **4D and Multi-plane Imaging manual** explains how to use the 4D function. The manual is included on the Vivid 7 Manual CD.

Follow these steps to test the basic 4D functionality:

1.) Select the 3V probe.
2.) Create an examination.
3.) Press **4D** on the Operator Panel. The 4D Volume Rendering screen is displayed.


GE Vingmed Ultrasound
15/10/04 9:44:28
3V
ADM Cardiac
MI 1.0
TIs 0.9
--:--:--
HR 58
15/10/04 9:44:28
1
2
3
4
5
6
7
8
V
V
5
10
15
B
HR 58
3D Live
Smoothness
Compress
Num. Cycles
CAPS
Rot
Ptr

Freq. 1.7/3.5 MHz
Focus 9.5 cm
Proc. 0/11/0/6/-
FPS 17.5
Scale kHz
29:29 (1.6:1.6 s)

1.) *Volume rendering display from cut-plane 1 (yellow).*
The volume rendering may be adjusted by rotating and translating the cut-plane 1.
2.) *Cut-plane 2 (white): 2D image in the azimuth plane.*
3.) *Cut-plane 3 (green): 2D image in the elevation plane.*
4.) *Geometric model: displays a three-dimensional model with cut-planes position and orientation.*
5.) *Color coded cut-plane markers indicate the other cut-planes position relative to the displayed cut-plane.*
6.) *View direction marker.*
7.) *Soft menu controls.*
8.) *Trackball functions.*

Figure 4-33 4D Volume Rendering screen

4.) Adjust the **Width** control so that the structure of interest is within the scanning volume.

4-3-10 4D Volume Rendering Test (cont'd)

5.) Using the trackball rotate and translate the volume rendering to display the structure of interest as described in the section below. Press **Angle** to get a pre-defined orientation before translating and/ or rotating the volume rendering. If necessary, press **Clear** to reset the orientation to the default position.

6.) Optimize the volume rendering using **4D Gain**, **Shading** and **Smoothness** controls.

7.) If desired, zoom in the area of interest.

8.) If desired, press **Layout** to display the volume rendering in a single screen.

9.) If necessary, use **Crop** tool to remove unwanted structures.

10.) Select **Img. Store** to save the acquisition.

4-3-11 Tissue Velocity Imaging (TVI) Checks

4-3-11-1 Introduction

TVI calculates and color codes the velocities in tissue. The tissue velocity information is acquired by sampling of tissue Doppler velocity values at discrete points.

4-3-11-2 Preparations

Use a phantom when doing these tests.

1.) Connect one of the probes, to the scanner’s left-most probe connector.
  - See *Probe Connection*, page *3-21* for info about connecting the probes
  - See *Probes*, page *9-80* for available probes

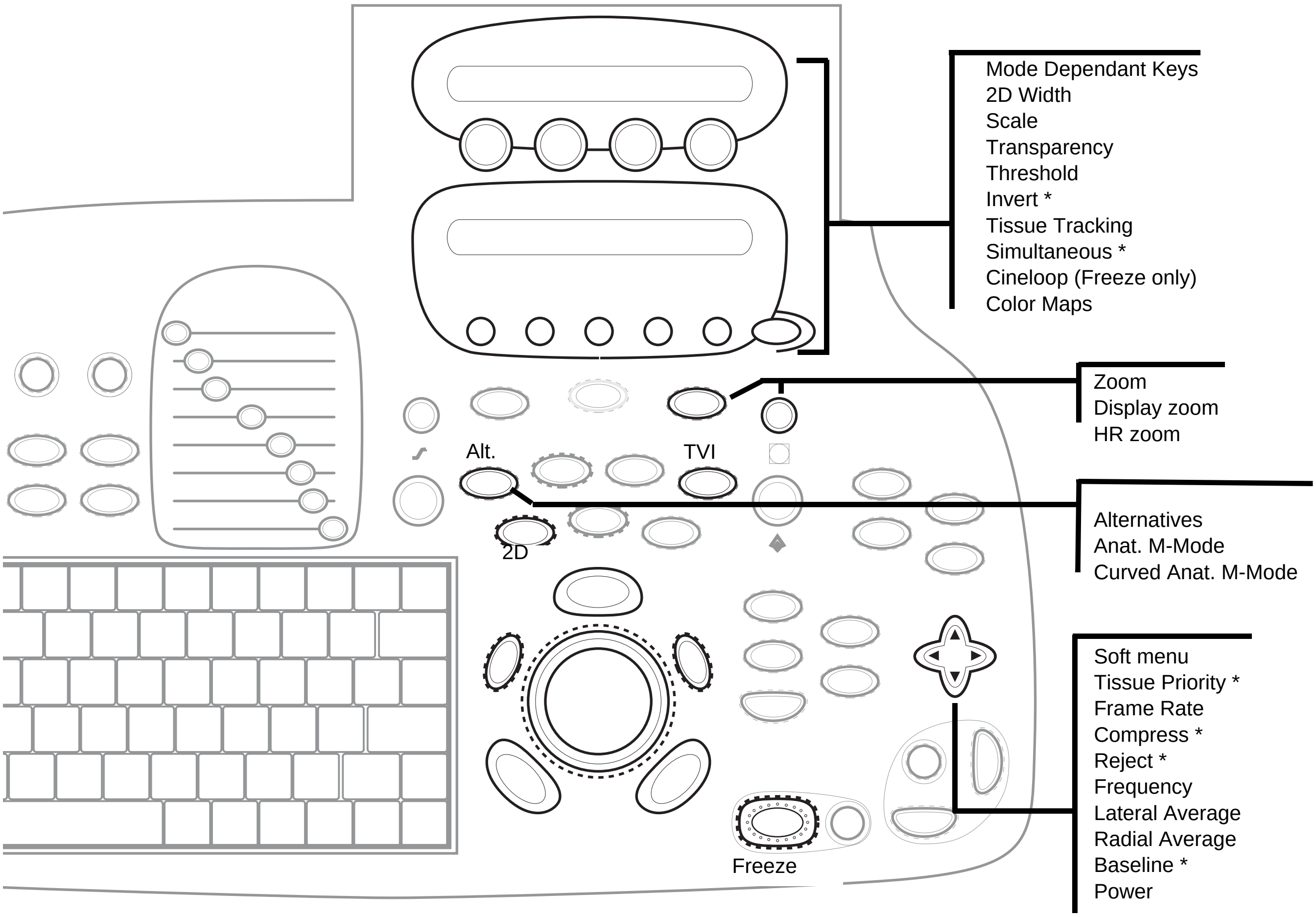
2.) Turn ON the scanner
  - See see 4-2-2 - Power ON/ Boot UP on page 4-3 for info about booting the scanner.

  The 2D Mode window is displayed (default mode).

3.) If needed, adjust the Display’s Brightness and Contrast setting.

4.) Press **TVI**.

4-3-11-2 Preparations (cont'd)

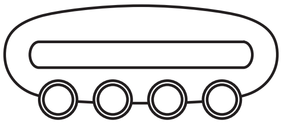
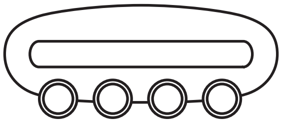
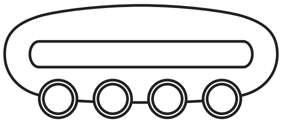
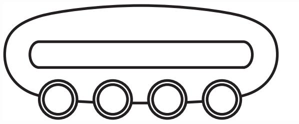

Mode Dependant Keys
2D Width
Scale
Transparency
Threshold
Invert *
Tissue Tracking
Simultaneous *
Cineloop (Freeze only)
Color Maps
Zoom
Display zoom
HR zoom
Alt.
TVI
Alternatives
Anat. M-Mode
Curved Anat. M-Mode
2D
Soft menu
Tissue Priority *
Frame Rate
Compress *
Reject *
Frequency
Lateral Average
Radial Average
Baseline *
Power
Freeze

Controls marked with * (asterisk) are also available in freeze and cine replay

Figure 4-34 Doppler Mode Controls

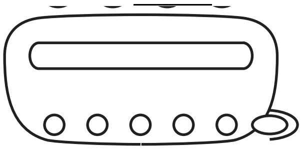
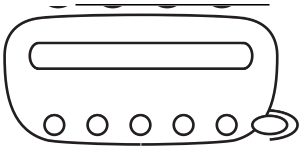
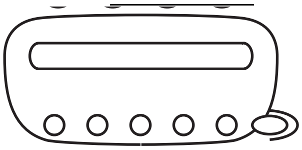
4-3-11-3 Check 2D Width, Scale, Transparency and Threshold

Table 4-23 TVI Mode Controls Checks

Step	Task	Expected Result(s)
1.	Adjust **2D WIDTH** 	Controls the size or angular width of the 2D sector.
2.	Adjust **SCALE** 	Controls the repetition rate of the Doppler pulses transmitted to acquire the data for color mapping. The scale value influences the Nyquist limit (the ability to detect maximal velocity without color aliasing.
3.	Adjust **TRANSPARENCY** 	Controls the degree of transparency of the TVI color.
4.	Adjust **THRESHOLD**. 	Controls the level of greyscale intensity that is used as a threshold for color.

4-3-11-4 Check Invert, Tissue Tracking, Simultaneous and Color Maps

Table 4-24 TVI Mode Controls Checks

Step	Task	Expected Result(s)
5.	Press **INVERT** 	Enables the color scheme assigned to positive and negative tissue velocities to be inverted. Invert is available in live and cine replay.
6.	Press **TISSUE TRACKING** 	Starts Tissue Tracking mode.
7.	Choose **COLOR MAPS** 	Displays a drop down menu of different colorization maps. Use the trackball to select the desired map and press Select to activate the map.

4-3-11-5 Check Tissue Priority, Frame Rate, Compress, Reject, Frequency, Lateral & Radial Average, Baseline and Power

Table 4-25 TVI Mode: Soft Menu Controls Check

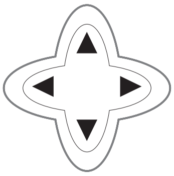
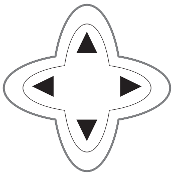
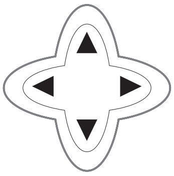
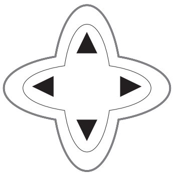
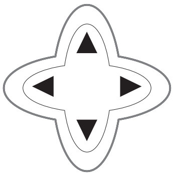
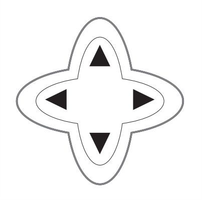
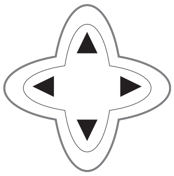
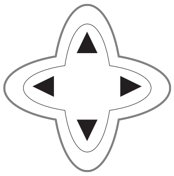
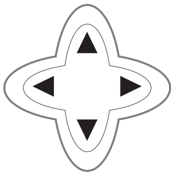
Step	Task	Expected Result(s)
8.	Adjust **TISSUE PRIORITY** 	Emphasizes either the color of the TVI or the greyscale tissue detail of the 2D image. Tissue priority is available in both Live and Freeze.
9.	Adjust **FRAME RATE** 	Controls the line density. When adjusting frame rate, there is a trade off between spatial and temporal resolution.
10.	Adjust **COMPRESS** 	Controls the amount of color compression. The color bar is adjusted accordingly.
11.	Adjust **REJECT** 	Adjust the cut-off level for the low velocity of TVI to be discarded when generating the color image.
12.	Adjust **FREQUENCY** 	Enables the adjustment of the transmission frequency to control the sensitivity or the level of penetration.

Table 4-25 TVI Mode: Soft Menu Controls Check

Step	Task	Expected Result(s)
13.	Adjust **LATERAL AVERAGE** 	Smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.
14.	Adjust **RADIAL AVERAGE** 	Smooths the image by averaging collected data along the same radial line. An increase of the radial averaging will reduce noise, but this will also reduce the radial resolution.
15.	Adjust **BASELINE** 	Adjusts the color map to emphasize tissue motion either toward or away from the probe. Baseline is available in both Live and Freeze.
16.	Adjust **POWER** 	Controls the amount of acoustic power applied in all modes. When power is set to maximum, it is equal to or less than the maximum acoustic power level permitted by regulatory standards. The Thermal Index (TI) and the Mechanical Index (MI) are displayed on the screen.

4-3-12 Contrast Checks

Refer to Chapter 5 in Vivid 7 User Manual.

4-3-13 Stress Echo

Refer to Chapter 4 in Vivid 7 User Manual.

4-3-14 Measurements and Multi Image Checks

4-3-14-1 Introduction to Measurements & Analysis (M&A)

- A complete M&A software package for Cardiac is included in the Vivid 7.
- The M&A software runs on the Back-End Processor.
- In this test, we just check one measurement, Calipers.

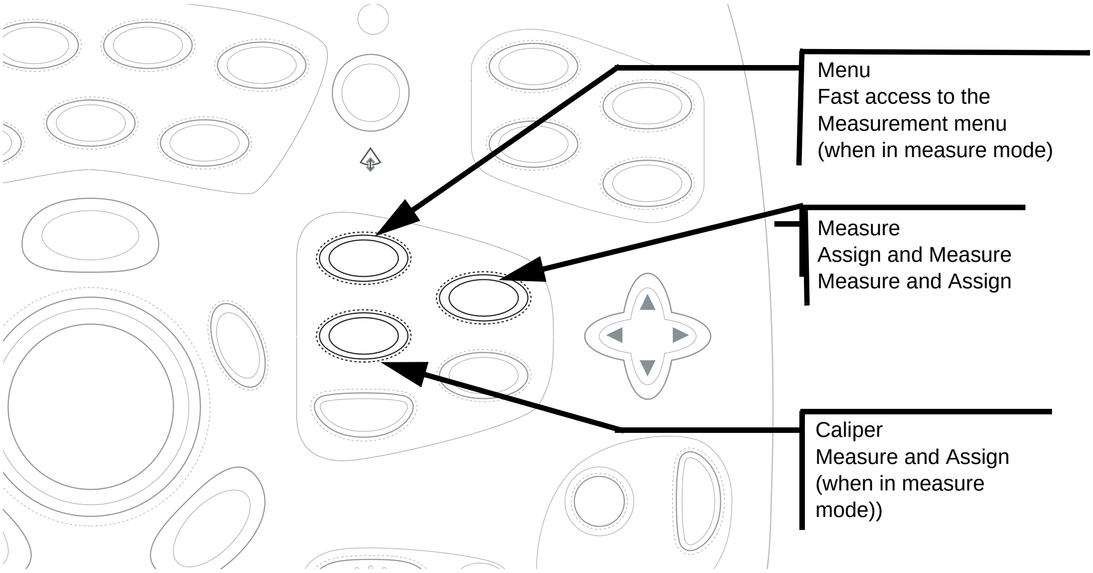

Menu
Fast access to the Measurement menu (when in measure mode)
Measure
Assign and Measure
Measure and Assign
Caliper
Measure and Assign (when in measure mode))

Figure 4-35 Measurement Keys

4-3-14-2 Preparations, M&A

Table 4-26 Measurement Key Checks

Step	Task	Expected Result(s)
1.	Generate a 2D image (see 4-3-6 - 2D Mode (B mode) Checks for details).	A 2D image is active on the screen
2.	Press **FREEZE** on the Operator Panel	The last scanned picture is on the screen.
3.	Scroll back until you find the picture you want to do the measurement on.	The picture of interest is on the screen.

4-3-14-3 Check Caliper Measurement, Distance

Table 4-27 Measurement Key Checks

Step	Task	Expected Result(s)
4.	Press **MEASURE** on the Operator Panel. Select **Caliper** in the Measurement menu. or Press **CALIPER** on the Operator Panel. Press the **CALIPER** mode dependant button	The Measurement menu with a list of studies is displayed in the Parameters window on the screen. When entering the Measurement mode for the first time, the Caliper tool is selected by default. When re-entering the Measurement mode, the first measurement in the actual study that has not been performed is selected by default.
5.	Use the Trackball to move the cursor to the start point of the measurement.	The cursor points to the start point for the measurement.
6.	Press **SELECT** to anchor the start point of the measurement.	The start point of the measurement is marked, and a line between the mark and the active cursor indicates the distance.
7.	Use the trackball to move the cursor to the end point of the measurement.	The current distance value is displayed in the Measurement result table and is instantaneously updated when moving the cursor.
8.	Press **SELECT** to mark the end point for the measurement.	The measurement display color on the 2D image changes from green to red after completion of the measurement. The measurement result is displayed in the Measurement result table.
9.	Trackball to the measurement result in the Measurement result table.	The highlighted parameter label is assigned to the measurement.

4-3-14-4 Check Post-measurement assignment labels

Table 4-28 Post-measurement assignment labels

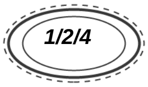
Step	Task	Expected Result(s)
10.	Trackball to the actual measurement in the Measurement Result Window. Press **SELECT** on the Operator Panel.	A Parameter menu is displayed.
11.	Trackball through the Parameter label menu to highlight the desired label. Press **SELECT** on the Operator Panel.	The highlighted parameter label is assigned to the measurement.

4-3-15 Multi Image Checks

4-3-15-1 Introduction to Multi Image

This unit has a special function for displaying two or four examination pictures at the same time

Table 4-29 Use of Multi Image Key

Key	Description
	Enables multiple image display windows in which two or four images can be viewed simultaneously. When reducing the number of images, the active window will always be kept.

4-3-15-2 Preparations

Use a phantom when doing these tests.

1.) Connect one of the probes, to the scanner's left-most probe connector.
  - See *Probe Connection*, page *3-21* for info about connecting the probes
  - See *Probes*, page *9-80* for available probes

2.) Turn ON the scanner
  - See 4-2-2 - Power ON/ Boot UP on page 4-3 for info about booting the scanner.

The 2D Mode window is displayed (default mode).

If needed, adjust the Display's Brightness and Contrast setting.

3.) Store four cineloops.

4-3-15-3 1,2,4 Key Check

Table 4-30 Multi Image Checks

Step	Task	Expected Result(s)
1.	Press the **1,2,4** Key once to display two images on the screen.	2 Images are displayed on the screen.
2.	Press the **1,2,4** Key once more to display four images on the screen.	4 Images are displayed on the screen.
3.	Press the **1,2,4** Key again to reduce the number of images on the screen.	1 image is displayed on the screen.

4-3-16 Probe/Connectors Check

NOTE: *Probes can be connected at any time, whether the unit is ON or OFF*

CAUTION **Take the following precautions with the probe cables:**
- Keep away from the wheels
- Do not bend
- Do not cross cables between probes

Table 4-31 Probe and Connectors Checks

Step	Task	Expected Result(s)
1.	Press **Probe** on the Operator Panel.	A list of the connected probes will pop up on the screen.
2.	If not already selected. use the trackball to select the desired probe.	An application menu for the desired probe is listed on the screen.
3.	Trackball to the desired application Press **Select** to launch the application. To change application without changing the current probe, press **Appl.** on the Operator Panel.	The selected application starts.
4.	Verify no missing channels	All channels is functioning.
5.	Verify there's no EMI/RFI or artifacts specific to the probe.	No EMI/RFI or artifacts.
6.	Test the probe in each active connector slot., see 3-6-5 "Probe Connection" on page 3-21	It will display pictorial data each time
7.	Do a leakage test on the probe, see Section 10-7 "Electrical Safety Tests" on page 10-12	It passes the test.
8.	Repeat this procedure for all available probes.	

4-3-17 ECG Check

4-3-17-1 Introduction

The ECG capability on this unit, is intended as use as a trigger for measurements, but can also be viewed on the screen.

4-3-17-2 Parts needed

- ECG Harness, P/N:16L0026 + P/N:16L0028
- ECG Pads, (3 pc)

or

- ECG simulator

4-3-17-3 Preparations

None

4-3-17-4 ECG Check

Table 4-32 ECG Check

Step	Task	Expected Result(s)
1.	Connect the ECG harness to the connector on the front of the system	The unit displays a straight curve along the bottom edge of the image sector on the screen.
2.	Connect the three leads to a ECG simulator, or Fasten the three ECG Pads to your body and connect the three leads to respective ECG Pad	- When connecting, the signal on the screen will be noisy - When the connection is completed, a typical clean ECG signal is displayed.

4-3-18 Cineloop Check

4-3-18-1 Introduction

A cineloop is a sequence of images recorded over a certain time frame. When using ECG the time frame can be adjusted to cover one or more heart cycles. When frozen the System automatically displays the cineloop boundary markers on either side of the last detected heart cycle (Figure 4-36).

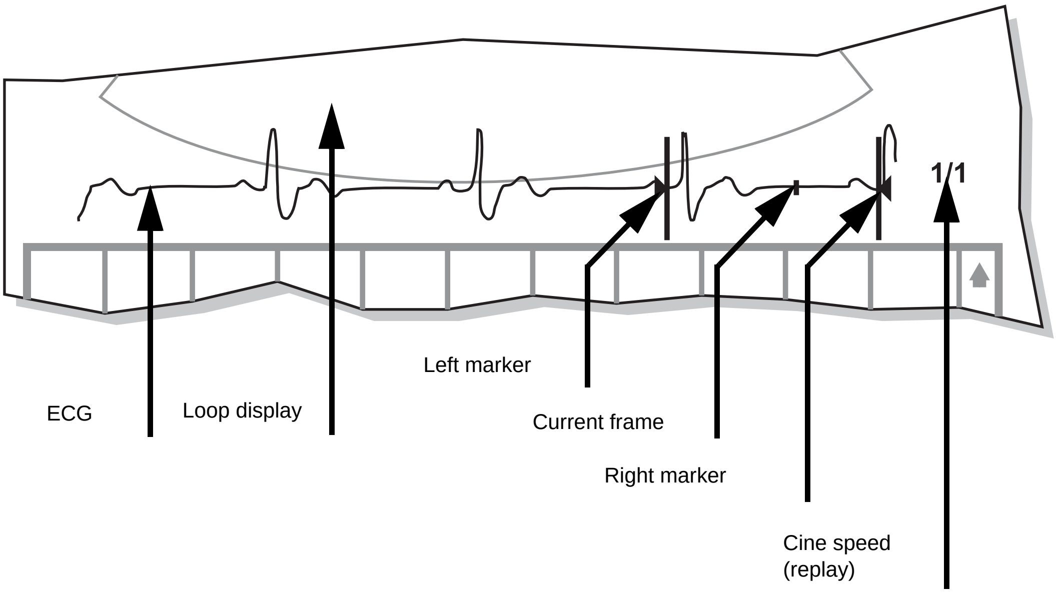


Figure 4-36 The Cineloop controls display

4-3-18-2 Preparation

Use a phantom when doing these tests.

1.) Connect one of the probes, to the scanner's left-most probe connector.
  - See 3-6-5 "Probe Connection" on page 3-21 for info about connecting the probes
  - See Section 9-26 "Probes" on page 9-80 for available probes
2.) Turn ON the scanner
  - See 4-2-2 "Power ON/ Boot UP" on page 4-3 for info about booting the scanner.

  The 2D Mode window is displayed (default mode).

3.) Press **Freeze** to freeze the image.
4.) Press the Mode Dependant button **Cineloop**.

4-3-18-2 Preparation (cont'd)

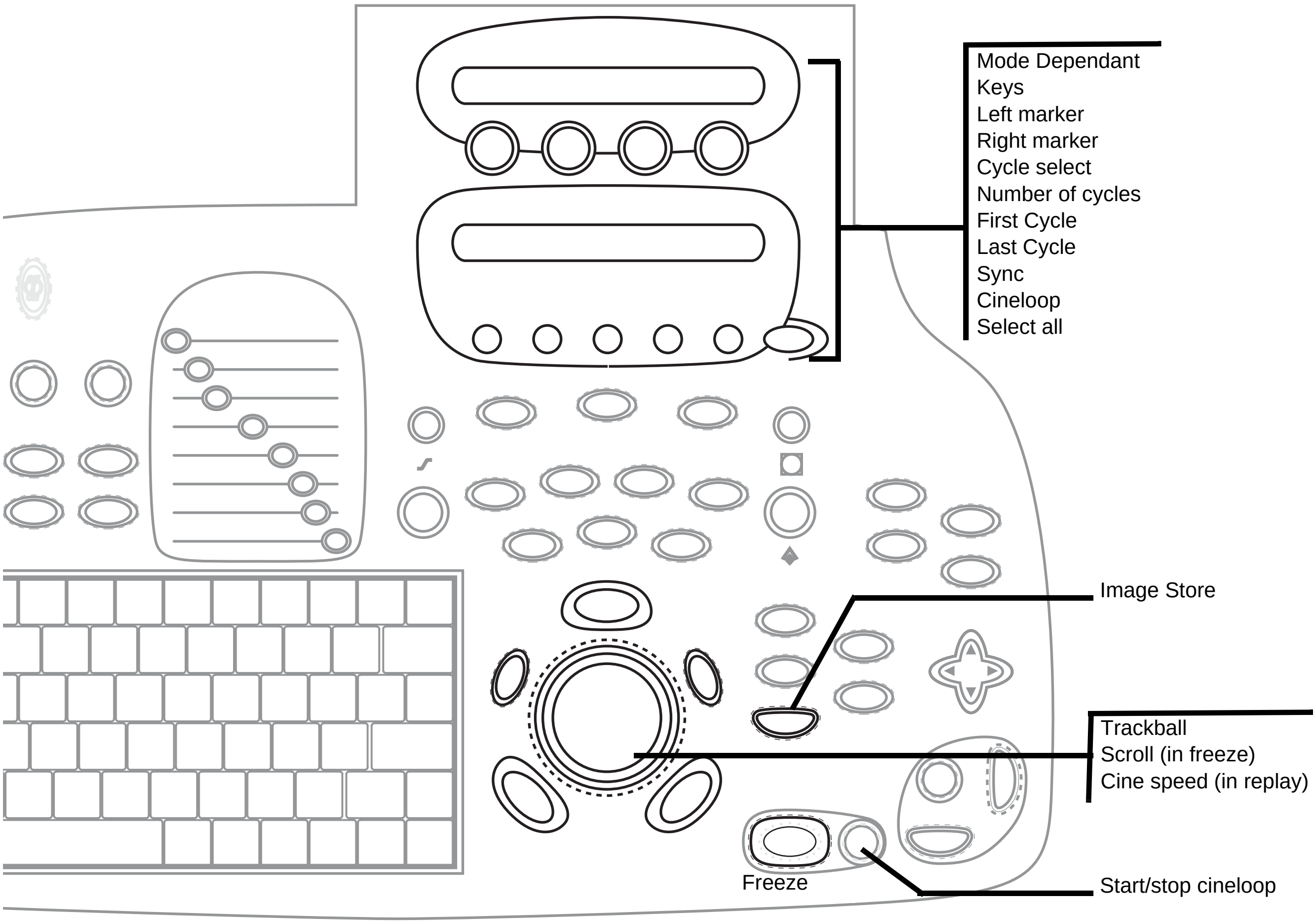
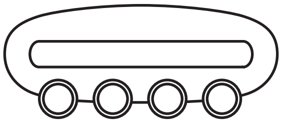
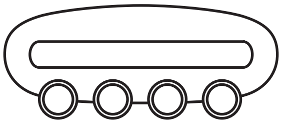
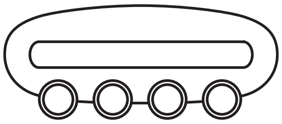

Mode Dependant
Keys
Left marker
Right marker
Cycle select
Number of cycles
First Cycle
Last Cycle
Sync
Cineloop
Select all
Image Store
Trackball
Scroll (in freeze)
Cine speed (in replay)
Freeze
Start/stop cineloop

Figure 4-37 Cineloop controls

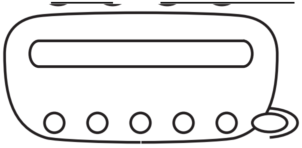
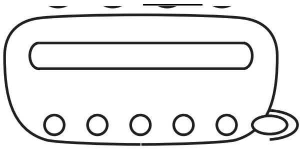
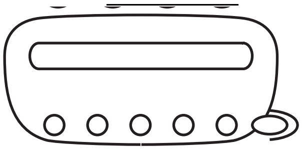
4-3-18-3 Check Left Marker, Right Marker, Cycle Select and Number of Cycles

Table 4-33 Cineloop Controls Checks

Step	Task	Expected Result(s)
1.	Adjust **LEFT MARKER** and **RIGHT MARKER** 	Moves the Left and Right Markers to expand or trim the cineloop boundaries.
2.	Adjust **CYCLE SELECT** 	Moves the cineloop boundaries from heart cycle to heart cycle.
3.	Adjust **NUMBER OF CYCLE** 	Increase or decrease the number of heart cycles to be included in the cineloop.

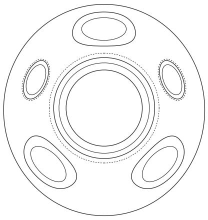
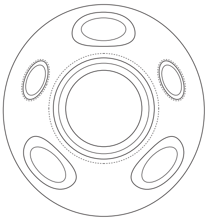
4-3-18-4 Check First, Last Cycle, Sync and Select all

Table 4-34 Cineloop Controls Checks

Step	Task	Expected Result(s)
1.	Press **FIRST** and **LAST CYCLE** 	Select either the first or the last heart cycle.
2.	Press **SYNC** 	Phase synchronize multiple loops.
3.	Press **SELECT ALL** 	Moves the cineloop boundaries to include all heart cycles.

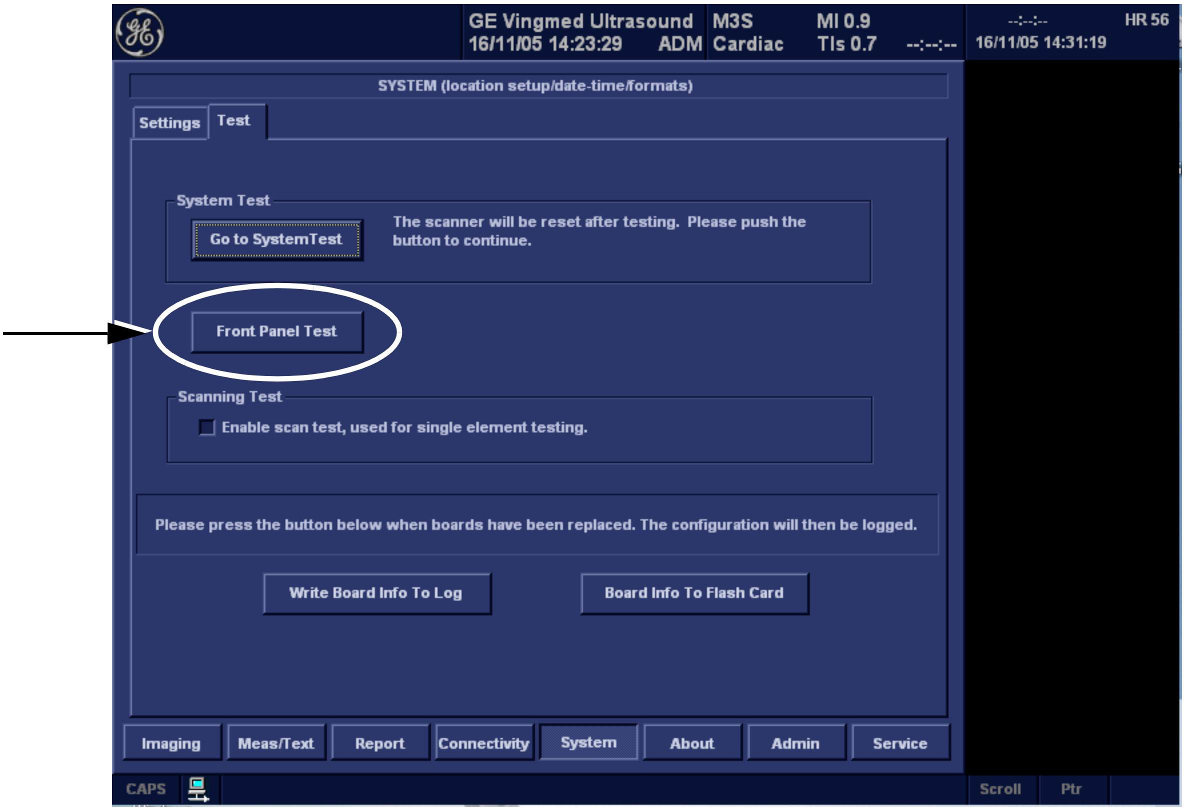
4-3-18-5 Adjust Scroll and Cine Speed

Table 4-35 Cineloop Controls Checks

Step	Task	Expected Result(s)
1.	Adjust **Scroll** (in Frozen mode): Press **TRACKBALL** until the Scroll trackball mode dependant button is selected. Use the Trackball. 	Move the current frame marker and review images.
2.	Adjust Cine Speed (in Cine Replay mode): Press **FREEZE** to freeze the image. Press **CINELOOP**. Roll the Trackball to the left. Roll the Trackball to the right. 	Step : the cine speed is decreased. Step : the cine speed is increased.

4-3-19 Back-End Processor Checks

- If all the previous tests have been passed successfully, the Back-End Processor is most likely OK.
- If the system seems to be operating erratically, please refer to Chapter 7 - Diagnostics/ Troubleshooting.


GE Vingmed Ultrasound 16/11/05 14:23:29 ADM
M3S Cardiac
MI 0.9 TIs 0.7
--:--:--
--:--:--
HR 56
16/11/05 14:31:19
SYSTEM (location setup/date-time/formats)
Settings
Test
System Test
Go to SystemTest
Front Panel Test
Scanning Test
Write Board Info To Log
Board Info To Flash Card
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service
CAPS
Scroll
Ptr

The scanner will be reset after testing. Please push the button to continue.

☐ Enable scan test, used for single element testing.

Please press the button below when boards have been replaced. The configuration will then be logged.

Figure 4-38 The Test pane

4-3-20 Peripheral Checks

4-3-20-1 Video Printers Checks

There may be both a black & white video printer and a color video printer on-board the system.

The Video Printers are controlled from the **PRINT** and **ALT.** keys on the scanner's Operator Panel. The factory default is **PRINT** for the B/W Video Printer and **ALT.** for the Color Video Printer.

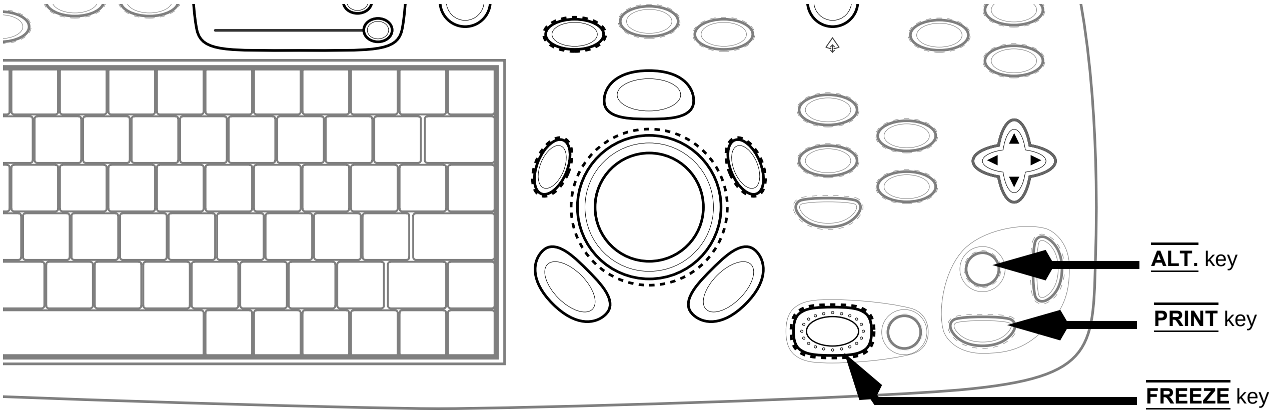


Figure 4-39 Freeze, Print 1 and Print 2 keys on the Operator Panel

Table 4-36 Video Printer(s) Checks

Step	Task	Expected Result(s)
1.	When scanning in 2D Color Mode, Press **FREEZE** to stop image acquisition.	Image scanning stops with the last picture on the screen.
2.	Press **PRINT** on the Operator Panel	The image displayed on the screen is printed on B&W or Color printer, depending on the key assignment configuration.
3.	Press **ALT**. on the Operator Panel	The image displayed on the screen is printed on Color or B&W printer, depending on the key assignment configuration
4.	Check if the print quality on the pictures both from the printers are of expected quality.	

4-3-20-2 DVR Checks

Please see chapter 5 in the Vivid 7 Peripherals Installation Manual, Part Number: FC294048 revision 3 (or newer).

4-3-20-3 VCR Checks

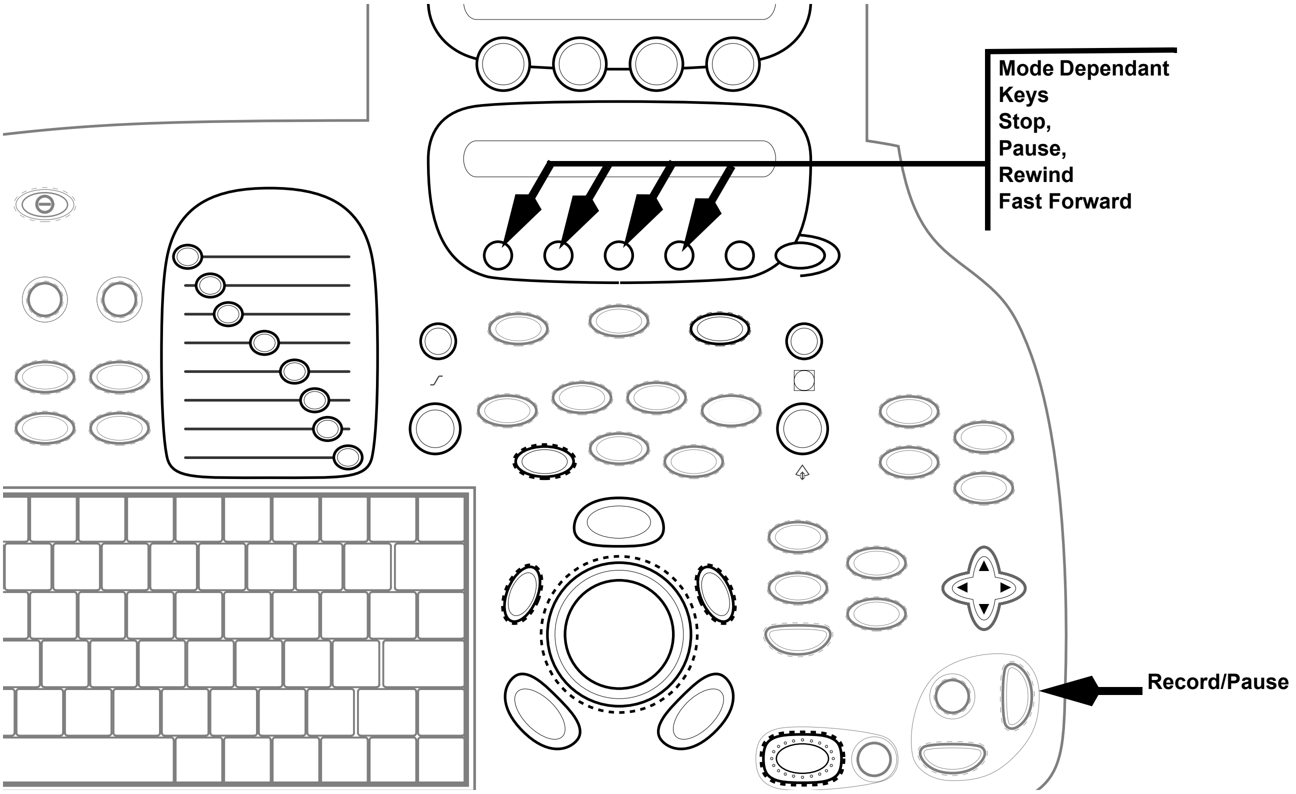


Figure 4-40 VCR Controls on the Operator Panel

4-3-20-4 VCR Counter Check

When adding new examinations to a Video cassette, you can set the VCR Counter without rewinding the Video Cassette to the start. The procedure below explains how to check this function.

Prerequisite:

The VCR Counter number when the Video Cassette was Ejected last time.

Table 4-37 VCR Counter Check

Step	Task	Expected Result(s)
1.	Insert the Video cassette in the VCR	
2.	Press **VIDEO** on the Operator Panel.	To start the video counter at a different point:
3.	Press **UPDATE MENU** in the Trackball area.	The *Video Set Counter / Search Dialog window* is displayed
4.	Use the **alphanumeric keyboard** to enter the counter number (from last time) in the counter field.	Number appears on the screen
5.	Press **Set Counter** to save the change.	Number is saved
6.	Press **VIDEO** on the Operator Panel, to return to scanning mode.	The system returns to the scanning mode

4-3-20-5 VCR Record Check

Table 4-38 VCR Checks

Step	Task	Expected Result(s)
1.	When scanning, press **REC/PAUSE** on the Operator Panel.	The VCR starts recording. A red dot is displayed in the screen's VCR status area on the Title bar. It indicates that recording has begun
2.	Press **REC/PAUSE** on the Operator Panel to stop recording.	The Recording stops. The video status icon on the screen is changed to (Pause)
3.	Note the counter meter setting on the VCR	.

4-3-20-6 Check Rewind, Fast Forward and Replay Video

Prerequisite:

A Video Tape in the VCR with at least one recorded examination.

Table 4-39 VCR Checks

Step	Task	Expected Result(s)
1.	Press **VIDEO** on the Operator Panel.	The Mode Dependant Keys changes to VCR controls
2.	Press **REWIND** (Mode Dependant button)	The VCR starts to rewind the video tape.(observe the counter)
3.	Press **STOP** (Mode Dependant button)	The VCR Stops
4.	Press **FAST FORWARD** (Mode Dependant button)	The VCR starts the Fast Forward (observe the counter)
5.	Use the controls above to navigate to the start of the recorded examination. Then press **PLAY** (Mode Dependant button) to replay the recording	The replay of the examination starts.
6.	While in playback mode, use the **Trackball** to adjust the video playback speed and scroll through the record.	The replay of the examination responds according to your commands
7.	Press **PAUSE** to stop the tape at the desired frame.	The tape stops at the desired video frame.
8.	When playing back an examination	part of it can be stored on the computer's memory as a cineloop.The cine loop enables the user to perform further operations on the stored section (see for further information on cine loop operation).
9.	Press **FREEZE** while playing back a recorded session.	**To store a recorded sequence as a cine loop The** last few seconds are stored as a cine loop.

4-3-20-7 Check Cineloop from Video

Prerequisite

A Video Tape in the VCR with at least one recorded examination.

Procedure

Table 4-40 VCR Cineloop Checks

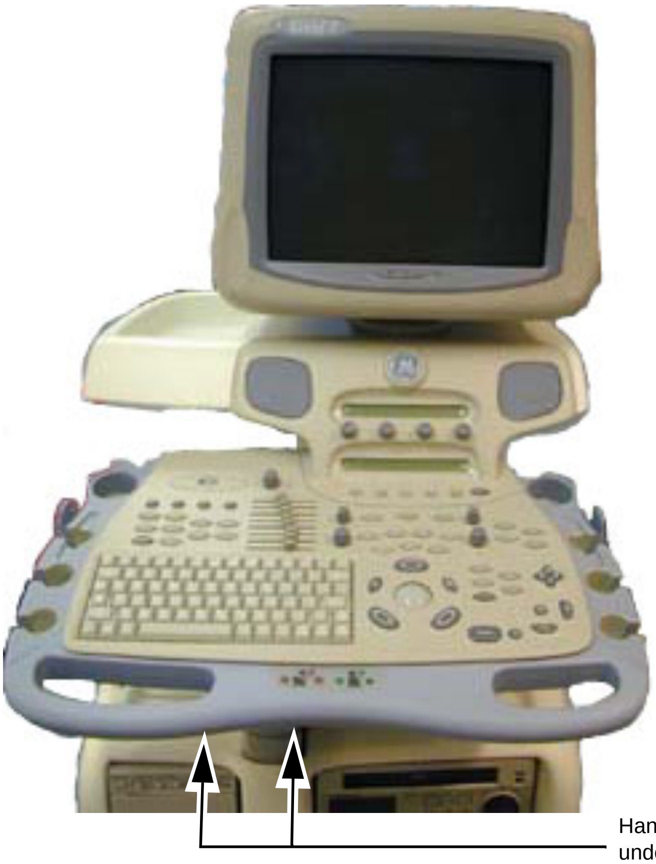
Step	Task	Expected Result(s)
1.	When in video play back (of an examination), press **FREEZE**.	The last part of the video is stored in the computer's memory as a cine loop.
2.	Use the Trackball to move back and forth in the cine loop.	The Cineloop is played back according to your manipulating of the trackball.

4-3-20-8 Turn OFF Power to Vivid 7

See 4-2-3 "Power Shut Down" on page 4-7.

4-3-21 Mechanical Functions Checks

4-3-21-1 Alphanumeric Keyboard and Display Platform (Console) Checks



Handles for horizontal and vertical lock (up under the platform)

Figure 4-41 Console with handles

Table 4-41 Display Platform Maneuverability Checks

STEP	TASK	NOTE(S)
1.	Pull handle up under the platform towards you to release horizontal lock	It is possible to maneuver the Display Platform horizontally at present level of height
2.	Pull handle at left hand grip towards you to release the Vertical Lock	It is possible to maneuver the Display Platform up and down (between the vertical end stops) as long as you pull the handle towards you
3.	Pull both handles towards you to release both Vertical and Horizontal locks	It is possible to maneuver the Display Platform both horizontally and vertically as long as you keep pulling these handles towards you

4-3-21-2 LCD Screen Movement

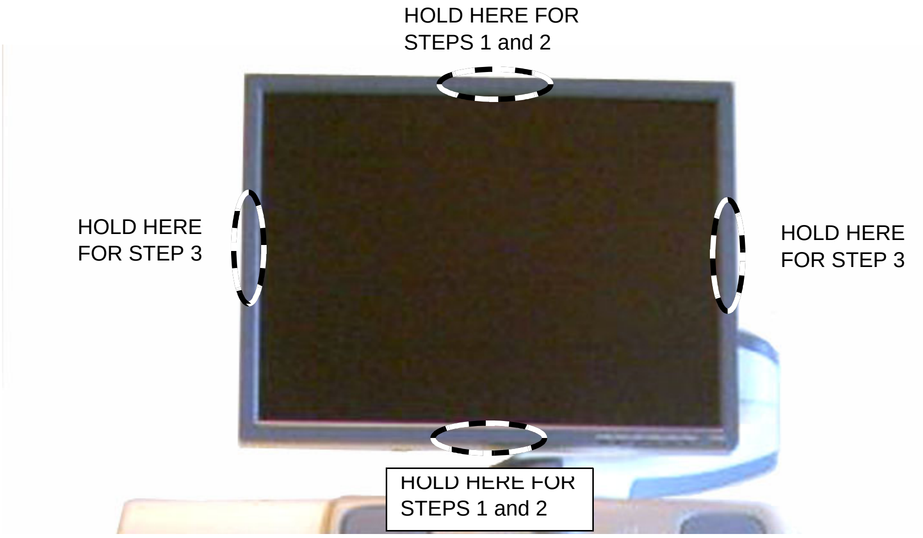

HOLD HERE FOR
STEPS 1 and 2
HOLD HERE
FOR STEP 3
HOLD HERE
FOR STEP 3
HOLD HERE FOR
STEPS 1 and 2

Figure 4-42 LCD Display Platform Maneuverability Checks

Table 4-42 LCD Display Platform Maneuverability Checks

STEP	TASK	NOTE(S)
1	MOVE UP/DOWN	Use both hands, one at the top of the LCD and one at the bottom, to adjust the LCD up and down,
2	TILT FORWARD/BACK	Use both hands, one at the top of the LCD and one at the bottom, to rotate the screen forward and back.
3	MOVE LEFT/RIGHT	Use both hands, one at the left frame of the LCD and one at the right frame, to adjust the screen left and right.

4-3-21-3 Brakes and Direction Lock Checks

Follow this procedure to verify that Brakes and Direction Locks function as intended.

Table 4-43 Brakes and Direction Lock Checks

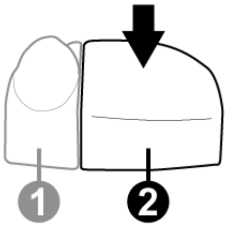
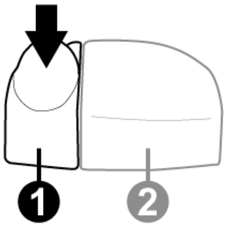
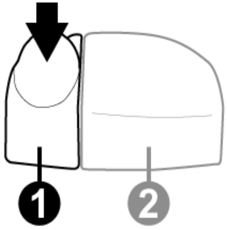
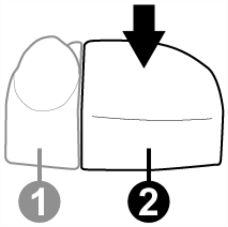
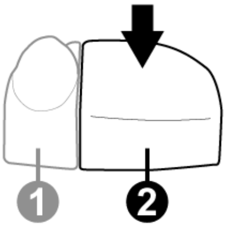
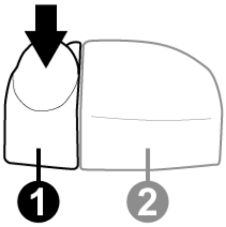
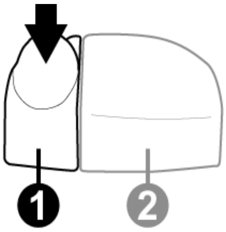
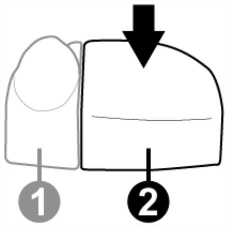
Step	Task	Expected Result(s)
1.	Press on pedal no. 2 	To engage the brakes in full lock
2.	Press on pedal no.1 	To release the brake
3.	Press on pedal no.1 	To engage swivel lock. You may need to move the system around a little to get the wheels to lock into the locked direction.
4.	Press on pedal no. 2 	To release swivel lock

Table 4-44 Brakes and Direction Lock Checks

STEP	TASK	FUNCTION	COMMENTS
1.	Press on pedal no. 2 	To engage the brakes in full lock	Test Brake effect, if not proper, see section 6-8-1 on page 6-9 for adjustment
2.	Press on pedal no.1 	To release the brake	
3.	Press on pedal no.1 	To engage swivel lock. You may need to move the system around a little to get the Casters to lock into the locked direction.	If Direction Lock doesn't work properly, see section 6-8-2 on page 6-10 for adjustment
4.	Press on pedal no. 2 	To release swivel lock	

Section 4-4
Application Turnover Check List

Complete these checks before returning the scanner to customer for use:

4-4-1 Software Configuration Checks

Table 4-45 Software Configuration Checks

STEP	TASK	CHECK (✓)
1.	Check Date and Time setting	
2.	Check that Location (Hospital Name & Department) is correct	
3.	Check Language settings	
4.	Check assignment of Printer Keys	
5.	Check that all of the customer’s options are correct installed	

Section 4-5
Power Supply

4-5-1 Power Supply Test Procedure

4-5-1-1 Introduction

There is no need to do any special tests on the Power Supplies if there don’t seems to be a problem that may be related to the Power Supplies.

4-5-1-2 Power Supply Adjustment

There are no adjustments on the power supplies. The DC Power is self-regulated. If a voltage is outside the specified range, it means that something is wrong, either with the power supply itself or with a unit connected to that specific power outlet.

Section 4-6
Site Log

Please use the Site Log found in Section 10-9 "Site Log" on page 10-27, or a similar Site Log, to record site visits.

Chapter 5
Components and Functions (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains Vivid 7's system concepts, component arrangement, and subsystem functions. It also describes the Power Distribution System and the Common Service Interface.

5-1-2 Contents in Chapter 5

Table 5-1 Contents in Chapter 5

SECTION	DESCRIPTION	PAGE NUMBER
5-1	Overview	5-1
5-2	General Information	5-2
5-3	a Front-End Processor (FEP)	5-6
5-4	Back-End Processor (BEP)	5-73
5-5	Patient I/O (Physio)	5-100
5-6	Internal I/O	5-103
5-7	Top Console with Monitor and Operator Panel	5-113
5-8	External I/O	5-117
5-9	Peripherals	5-123
5-10	Modem (Option)	5-124
5-11	Power Distribution	5-127
5-12	Mechanical Descriptions	5-141
5-13	Air Flow Control	5-146
5-14	Software Overview	5-147
5-15	Connectivity Theory	5-148
5-16	Product Manuals	5-151
5-17	Service Platform	5-152

Section 5-2
General Information

5-2-1 Introduction

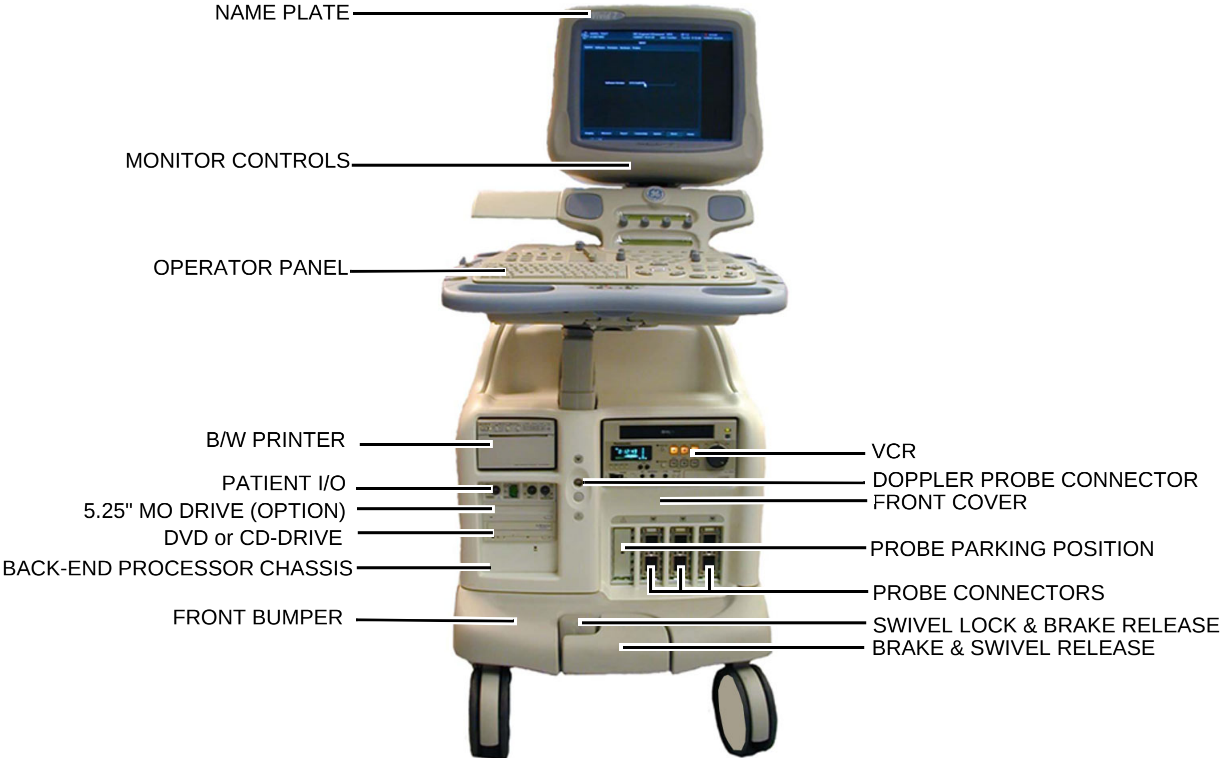

NAME PLATE
MONITOR CONTROLS
OPERATOR PANEL
B/W PRINTER
PATIENT I/O
5.25" MO DRIVE (OPTION)
DVD or CD-DRIVE
BACK-END PROCESSOR CHASSIS
FRONT BUMPER
VCR
DOPPLER PROBE CONNECTOR
FRONT COVER
PROBE PARKING POSITION
PROBE CONNECTORS
SWIVEL LOCK & BRAKE RELEASE
BRAKE & SWIVEL RELEASE

Figure 5-1 Vivid 7 Major Components

The Vivid 7 ultrasound scanner can be used with both phased array and linear array ultrasound probes and Doppler (Pedof) probes.

The system can be used for:

- 2D Gray Scale and 2D Color Flow Imaging
- M-Mode Gray Scale Imaging
- Color M-Mode
- Doppler
- 4D (Realtime 3D, introduced 2004)
- Different combinations of the above modes

Vivid 7 is a digital beamforming system. Signal flow travels from the Probe Connector Panel to the Front End Electronics, then to the Back-End Processor, and finally, the results are displayed on the monitor

System configuration is stored on the hard drive (inside the Back-End Processor (BEP)) and all necessary software is loaded from the hard drive on power up.

A Physio module, the Patient I/O, is incorporated in the Back-End Processor (BEP) to provide ECG signals to synchronize cardiac ultrasound image acquisition. Other analog signals, from devices such as treadmills (e.g. ECG and phono), are also processed by the Patient I/O.

5-2-2 Signal Flow

The TX board(s) in the Front-End Processor, generates the strong bursts transmitted by the probes as ultrasound into the body. The Transmit bursts are routed from the TX board via the XD bus to the Relay board where the ultrasound probes are connected.

Weak ultrasound echoes from blood cells and body structure are received by the probes and routed via the Relay board and the XD bus to the RX board. The RX board amplifies these signals and converts them to a digital signal.

After amplification and digital signal processing in the Front-End electronics, the signal is transferred via the PCI bus to the Back-End Processor where the signal is converted to video.

The video signals are connected to the monitor, to the Cassette Video Recorder (VCR) and the internal video printers. The signals are also converted so they can be connected to Digital Printers.

5-2-3 System Configuration and Software

System configuration is stored on a hard disk drive inside the Back-End Processor.

At power up, all necessary software is loaded from the hard disk.

5-2-4 Operator Panel

The user initiates system operation via the Operator Panel which contains an alphanumeric keyboard and a control panel with controls for TGC and the LCD displays.

5-2-5 The Electronics

Vivid 7 internal electronics are divided into two card cages;

- Front-End Processor (FEP)
  The FEP is sometimes called “Front-End Card Cage” or only “Card Cage”.
- Back-End Processor (BEP)

Interconnecting signals and power distribution between the different modules are routed via the backplane, via cables, via the Internal I/O and the External I/O.

5-2-6 Block Diagram - Units with Front-End Card Cage, version 1 (FEP1)

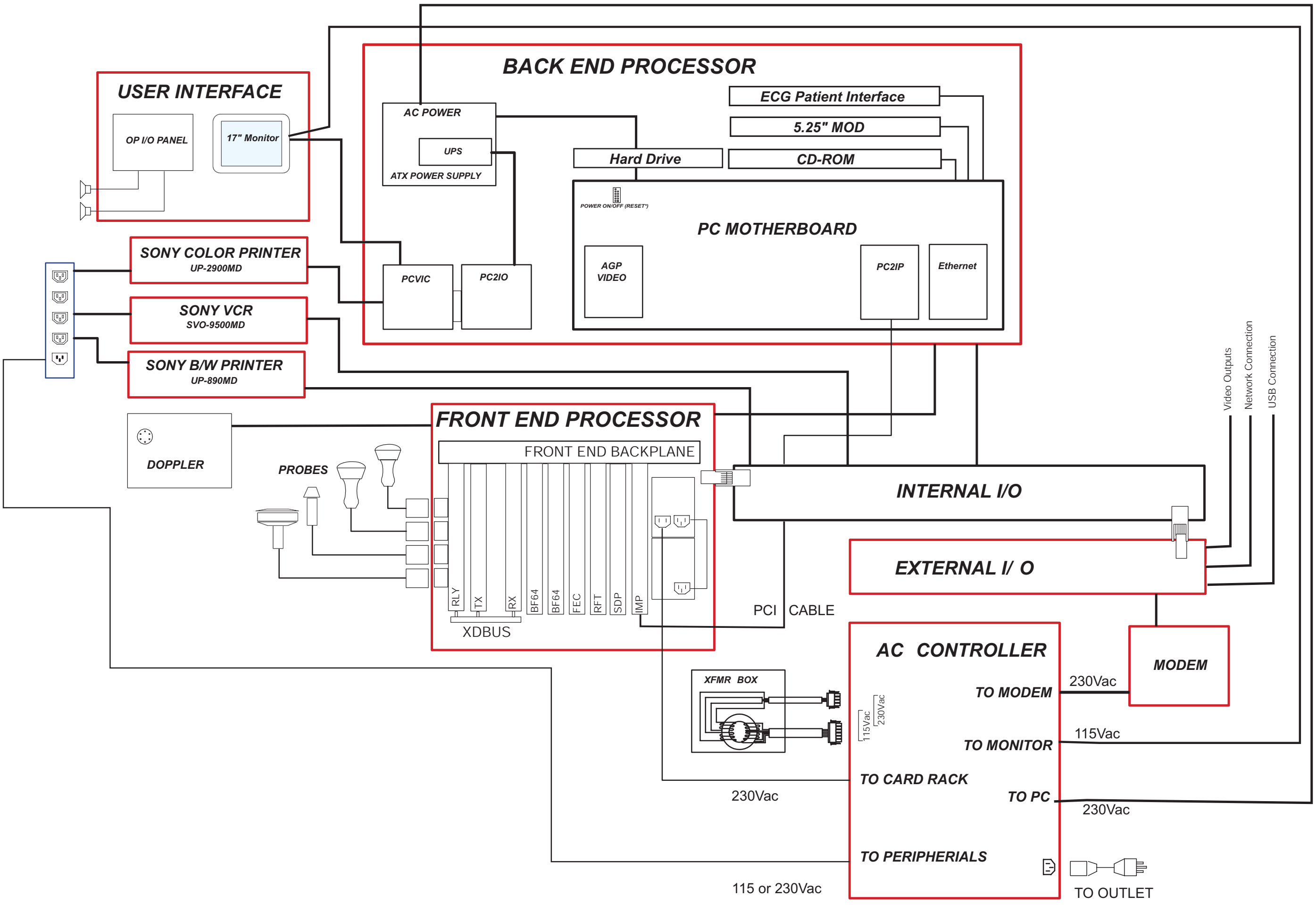

USER INTERFACE
OP I/O PANEL
17" Monitor
BACK END PROCESSOR
AC POWER
UPS
ATX POWER SUPPLY
ECG Patient Interface
5.25" MOD
Hard Drive
CD-ROM
POWER ON/OFF (RESET)
PC MOTHERBOARD
PCVIC
PC2IO
AGP VIDEO
PC2IP
Ethernet
SONY COLOR PRINTER
UP-2900MD
SONY VCR
SVO-9500MD
SONY B/W PRINTER
UP-890MD
DOPPLER
PROBES
FRONT END PROCESSOR
FRONT END BACKPLANE
RLY
TX
RX
BF64
BF64
FEC
RFT
SDP
IMP
XDBUS
INTERNAL I/O
Video Outputs
Network Connection
USB Connection
EXTERNAL I/ O
PCI
CABLE
AC CONTROLLER
MODEM
TO MODEM
230Vac
XFMR BOX
115Vac
230Vac
TO MONITOR
115Vac
TO CARD RACK
230Vac
TO PC
230Vac
TO PERIPHERIALS
115 or 230Vac
TO OUTLET

Figure 5-2 Vivid 7 Simple Block Diagram - Units with Front-End Card Cage version 1 (FEP1)

5-2-7 Block Diagram - Units with Front-End Card Cage, version 2 (FEP2)

NOTE: *In this block diagram, the BEP2.2 is illustrated.*

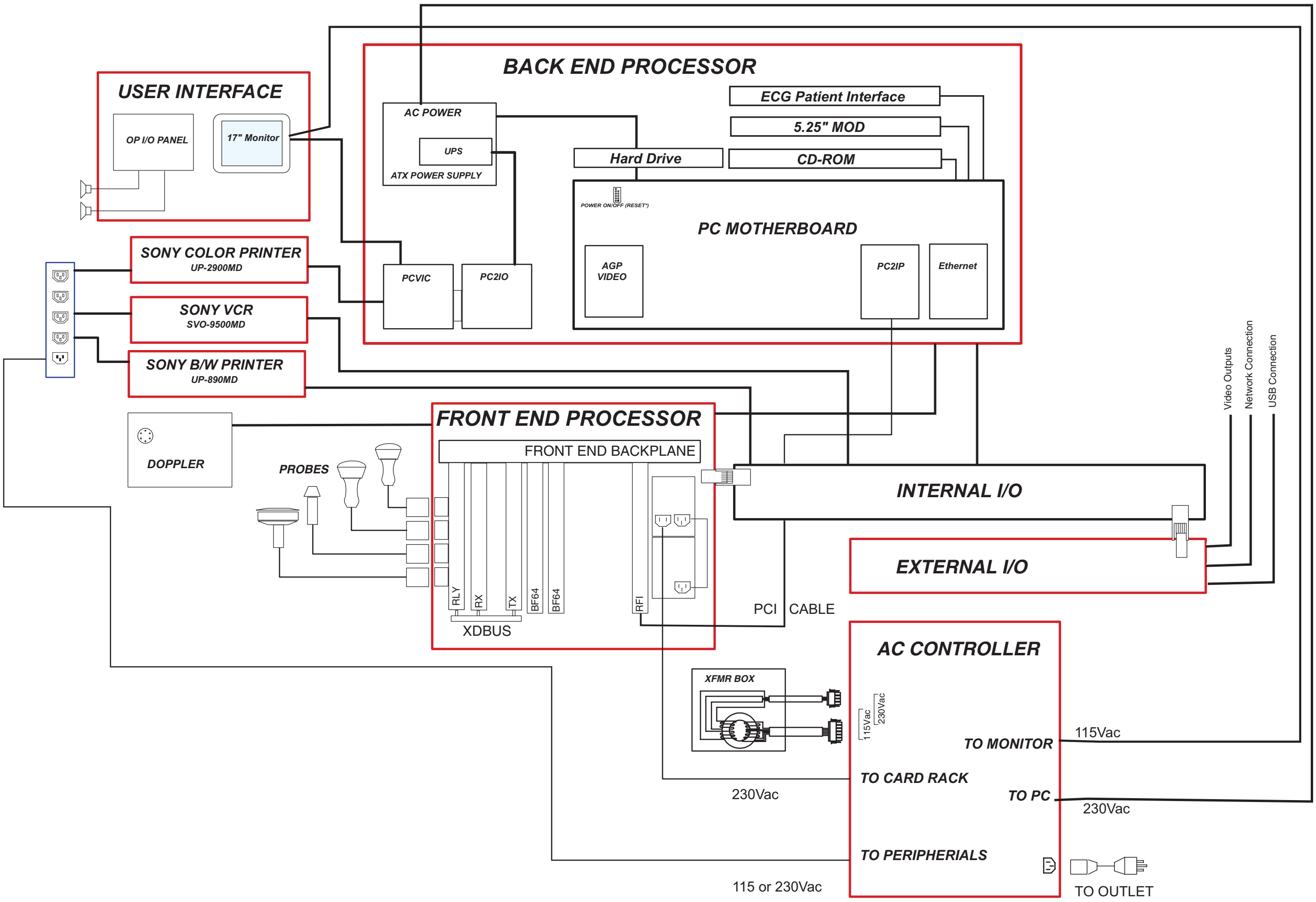

USER INTERFACE
OP I/O PANEL
17" Monitor
BACK END PROCESSOR
AC POWER
UPS
ATX POWER SUPPLY
ECG Patient Interface
5.25" MOD
Hard Drive
CD-ROM
POWER ON/OFF (RESET*)
PC MOTHERBOARD
AGP VIDEO
PC2IP
Ethernet
PCVIC
PC2IO
SONY COLOR PRINTER
UP-2900MD
SONY VCR
SVO-9500MD
SONY B/W PRINTER
UP-890MD
DOPPLER
PROBES
FRONT END PROCESSOR
FRONT END BACKPLANE
RLY
RX
TX
BF64
BF64
RFI
XDBUS
PCI
CABLE
INTERNAL I/O
EXTERNAL I/O
Video Outputs
Network Connection
USB Connection
AC CONTROLLER
XFMR BOX
115Vac
230Vac
TO MONITOR
115Vac
TO CARD RACK
230Vac
TO PC
230Vac
TO PERIPHERIALS
115 or 230Vac
TO OUTLET

Figure 5-3 Vivid 7 Simple Block Diagram - Units with Front-End Card Cage, version 2 (FEP2)

Section 5-3a
Front-End Processor (FEP)

5-3-1 General Description

The electronics in the Front-End Card Cage is also called the Front-End Processor (FEP).

Two versions of the Front-End Card Cage are in use;

- Version 1 (FEP1) was used from introduction of Vivid 7 until 2nd half of 2003
- Version 2 (FEP2) was introduced 2nd half of 2003

⚠ **NOTICE** Be careful so you don't insert a card in the wrong position in the card rack. If the power is turned on with a card placed in the wrong position, the Vivid 7 will be destroyed.

5-3-2 FEP1

FEP1 has eight *different* types of electronics cards, totally 10 cards. The cards are listed in Table 5-2.

Table 5-2 Front-End Processor Cards used in FEP1

SHORT NAME	COMPLETE NAME	COMMENT
RLY	RELAY BOARD	
TX	TRANSMITTER BOARD	
RX	RECEIVER BOARD	
BF	BEAM FORMER BOARD	2X USED PER UNIT
FEC	FRONT-END CONTROLLER BOARD	
RFT	RADIO FREQUENCY & TISSUE BOARD	
SDP	SPECTRUM DOPPLER PROCESSOR BOARD	
IMP	IMAGE PORT	SOMETIMES CALLED "IMPORT"
XDBUS	TRANSDUCER BUS BOARD	2X USED PER UNIT

5-3-3 FEP2

- In units with FEP2, a new card, the Radio Frequency Interface (RFI) card replaces four of the cards used in FEP1.
  The cards used for FEP2 units are listed in Table 5-3 "Front-End Processor Cards used in FEP2" on page 5-7.

Table 5-3 Front-End Processor Cards used in FEP2

SHORT NAME	COMPLETE NAME	COMMENT
RLY	RELAY BOARD	
TX	TRANSMITTER BOARD	2X TO BE USED PER UNIT FOR 3D OPTION (ONLY, NOT FOR PRO))
RX	RECEIVER BOARD	
BF	BEAM FORMER BOARD	2X USED PER UNIT
RFI	RADIO FREQUENCY INTERFACE BOARD	
XDBUS	TRANSDUCER BUS BOARD	2X USED PER UNIT

5-3-4 FEP's Location in the Unit

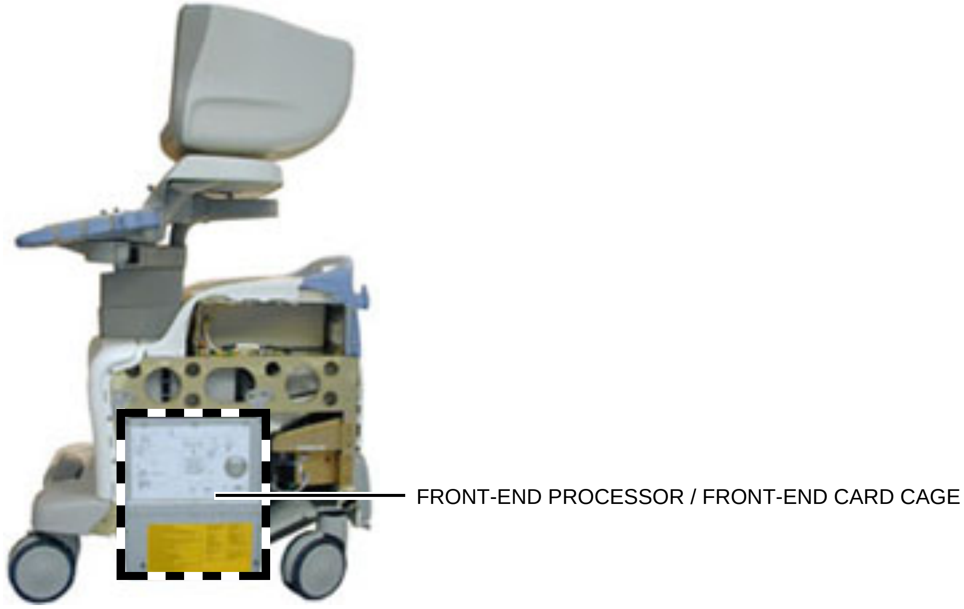


Figure 5-4 Front-End Processor's Location

5-3-5 Input Signals

- RX signals from probes
- Physio (ECG/Phono)

5-3-6 Bidirectional Signals

PC2IP bus to BEP

5-3-7 Output Signals

- TX signals to probe
- Doppler and Color Flow Data to Back-End Processor for digital signal processing
- Digital Video Data to Back-End Processor

5-3-8 Fuses, Jumpers, Dip-switches and LEDs

See descriptions for each card.

5-3-9 Transmitter and Receiver Subsystem

5-3-9-1 Transmitter Signal Path - Units With One TX Board

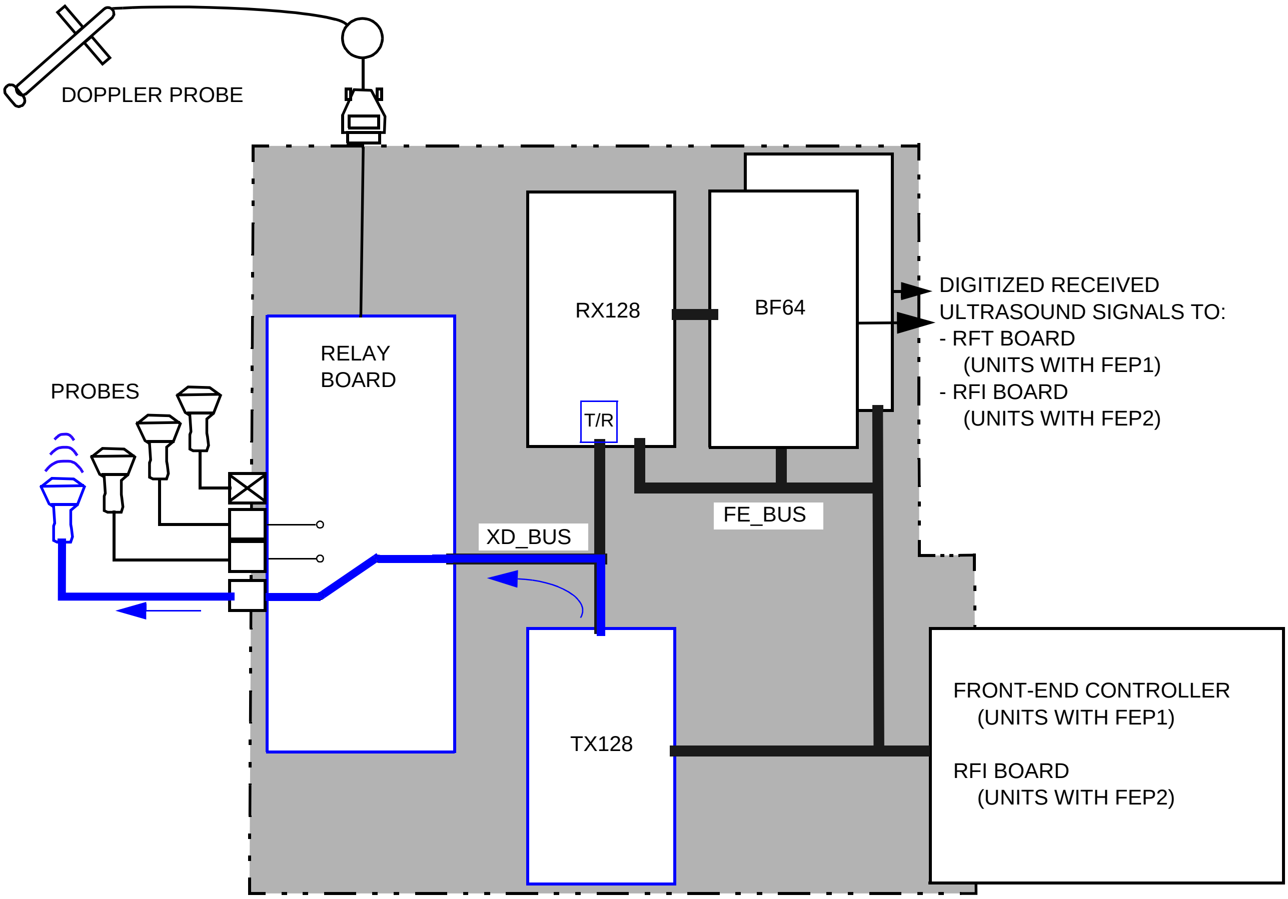

DOPPLER PROBE
PROBES
RELAY BOARD
RX128
T/R
BF64
DIGITIZED RECEIVED ULTRASOUND SIGNALS TO:
- RFT BOARD
(UNITS WITH FEP1)
- RFI BOARD
(UNITS WITH FEP2)
XD_BUS
FE_BUS
TX128
FRONT-END CONTROLLER
(UNITS WITH FEP1)
RFI BOARD
(UNITS WITH FEP2)

Figure 5-5 The Ultrasound Transmitter with one TX board

- The Front-End Controller board (FEP1) or the Radio Frequency Interface board (FEP2) loads scan parameters via the FE_BUS into local RAM on the TX board and on the BF boards.

  The scan parameters includes probe dependant steering and focusing delay for a certain scan pattern. Thus, when the Front-End Controller board (FEP1) or Radio Frequency Interface board (FEP2) goes through a scan sequence, it loads the proper contents of the RAM into the Transmitter Pulse Generator (TPG), then issues a transmit trigger pulse (TXTRIG_L) for the transmitter and a receive synchronization pulse (SYNC_L) for the Beam Formers.

  By firing the transmit pulses from the different elements at certain repeated time intervals and with different delays, the ultrasound beam can be steered in desired directions to obtain the selected scan patterns (e.g. 2D, 2D Flow etc.).

- The ultrasound transmit bursts are generated on the TX board, initiated by the transmit trigger pulse (TXTRIG_L). The transmit trigger starts the Transmit Pulse Generators (TPG) on the TX board, each generating 16 transmit pulses with different delays. The transmit pulses are then routed to separate transmit “amplifiers” fed with voltage HV1 and HV2. The voltages HV1 and HV2 are controlled by the Acoustic Power Control software.
- The transmit pulses are routed over the Transducer Bus Board (XDBUS) located on the front side of the TX and RX boards, to the Relay board, where they are fed to the selected probe.

5-3-9-2 Transmitter Signal Path - Units With Two TX Board

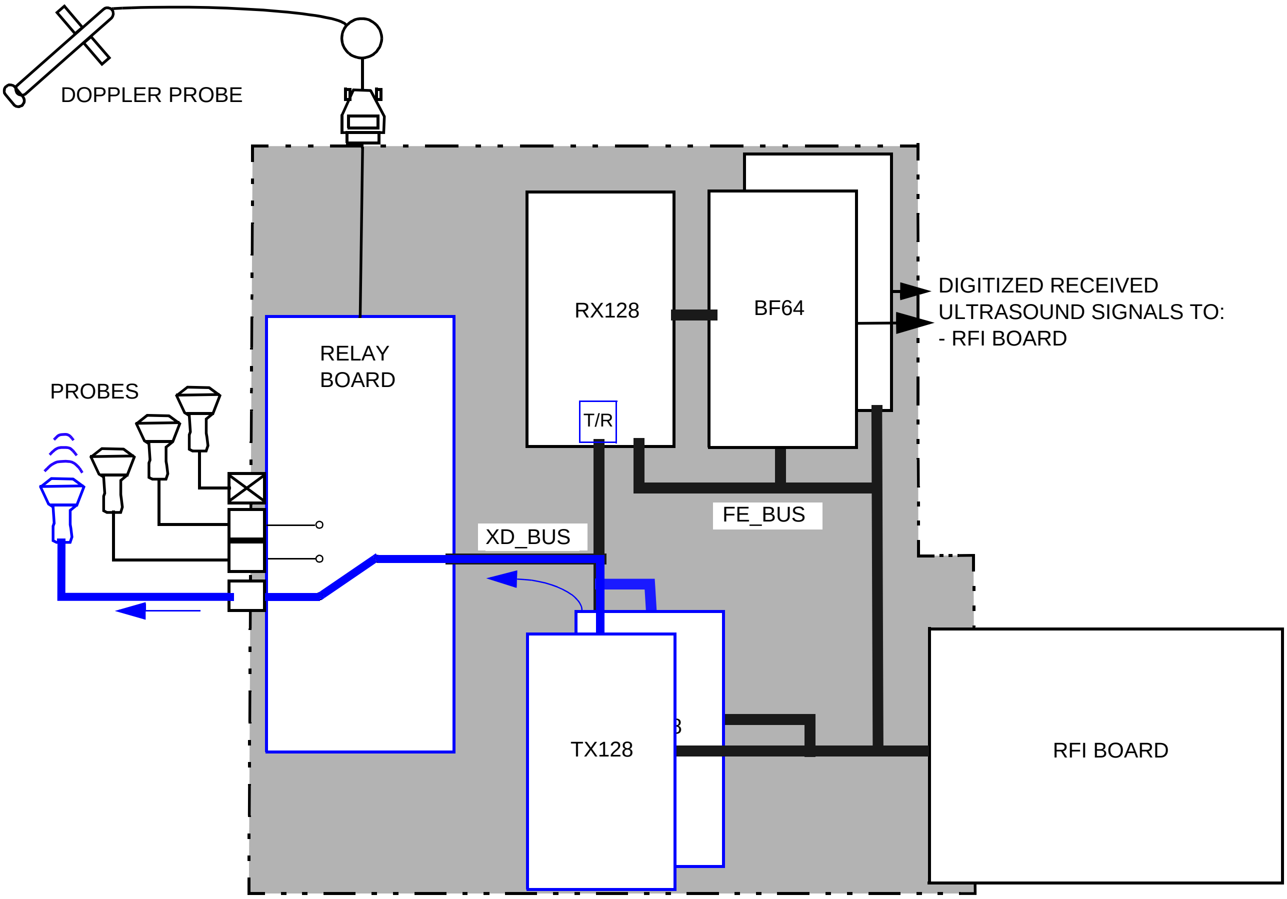


Figure 5-6 The Ultrasound Transmitter with two TX boards

- The Radio Frequency Interface board (RFI) loads scan parameters via the FE_BUS into local RAM on the TX boards and on the BF boards.

  The scan parameters includes probe dependant steering and focusing delay for a certain scan pattern. Thus, when the Radio Frequency Interface board goes through a scan sequence, it loads the proper contents of the RAM into the Transmitter Pulse Generator (TPG), then issues a transmit trigger pulse (TXTRIG_L) for the transmitter and a receive synchronization pulse (SYNC_L) for the Beam Formers.

  By firing the transmit pulses from the different elements at certain repeated time intervals and with different delays, the ultrasound beam can be steered in desired directions to obtain the selected scan patterns (e.g. 2D, 2D Flow etc.).

- The ultrasound transmit bursts are generated on the TX boards, initiated by the transmit trigger pulse (TXTRIG_L). The transmit trigger starts the Transmit Pulse Generators (TPG) on the TX boards, each generating 16 transmit pulses with different delays. The transmit pulses are then routed to separate transmit “amplifiers” fed with voltage HV1 and HV2. The voltages HV1 and HV2 are controlled by the Acoustic Power Control software.
- The transmit pulses are routed over the Transducer Bus Board (XDBUS), located on the front side of the TX and RX boards, to the Relay board, where they are fed to the selected probe.

5-3-9 Transmitter and Receiver Subsystem (cont'd)

5-3-9-3 Phased, Linear and Convex Array Probes

- The Phased, Linear and Convex array probes consist of several identical transducer elements (e.g. 64, 128, 192).
- Three probes can be connected to the system at the same time. The probe connectors are physically located on the Relay Board, where one of them is selected and connected to the transmitter (TX board) and receiver (RX board) through a number of relays.
- See "Probes" on page 9-80 for a list of available probes.

5-3-9-4 Receiver Signal Path

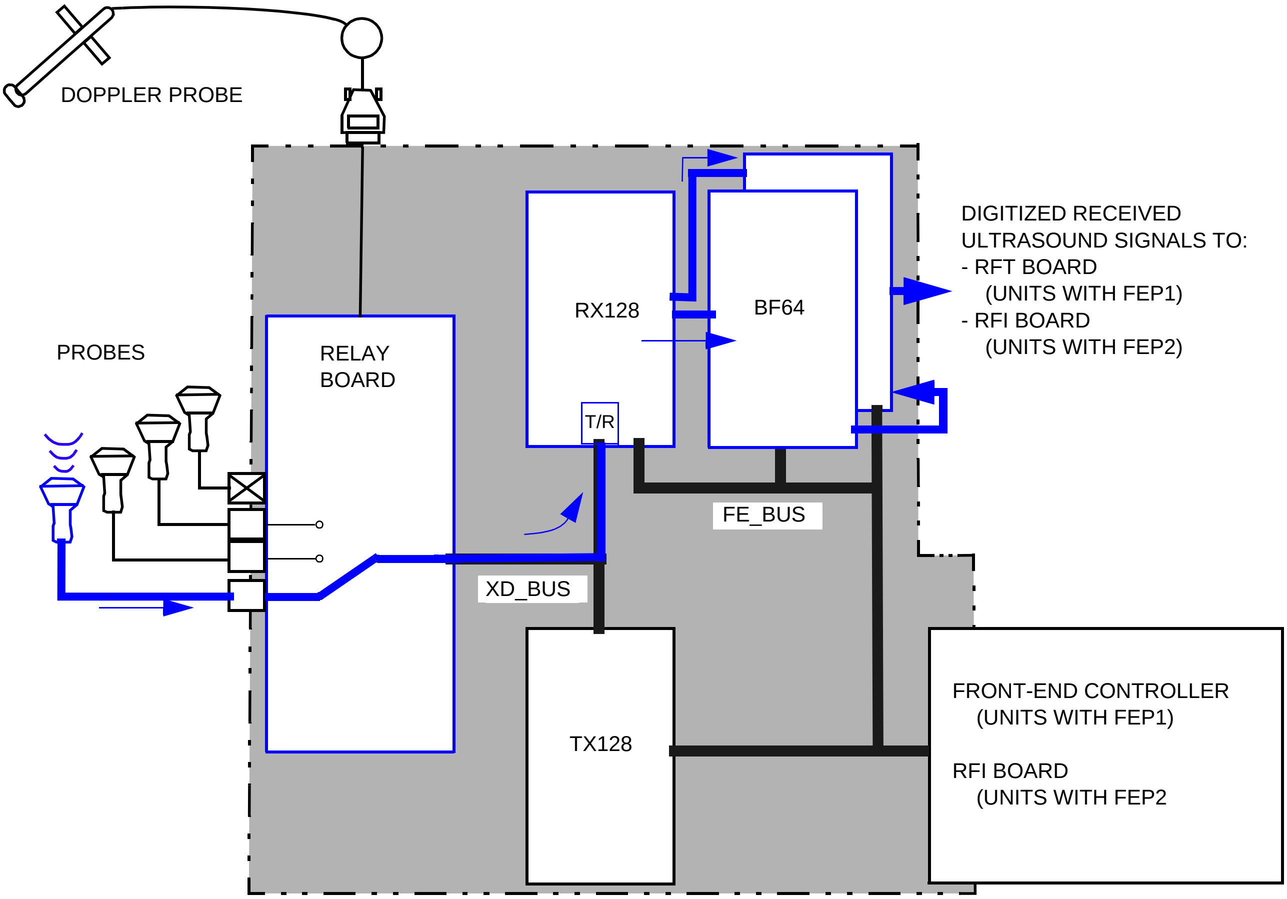

DOPPLER PROBE
PROBES
RELAY BOARD
RX128
T/R
BF64
DIGITIZED RECEIVED ULTRASOUND SIGNALS TO:
- RFT BOARD
(UNITS WITH FEP1)
- RFI BOARD
(UNITS WITH FEP2)
FE_BUS
XD_BUS
TX128
FRONT-END CONTROLLER
(UNITS WITH FEP1)
RFI BOARD
(UNITS WITH FEP2

Figure 5-7 The Ultrasound Receiver

- The reflected signal from body structures and blood cells are routed from the probe, via the Relay board over the Transducer Bus to the RX (receiver) board, where pre amplification (20dB) and Analog Time Gain Compensation (ATGC) (-10 - +30 dB) is performed. Gain is determined by an analog signal (ATGC) generated by the Front-End Controller board (FEP1) or by the Radio Frequency Interface board (FEP2).
- On the very input of the RX board are transmit/receive (T/R) switches to prevent the transmitters from destroying the receivers.
- The output channels from the RX board are fed to the Beam Former boards. Each Beam Former board performs A/D conversion of 64 channels.

5-3-9-5 Signal Control

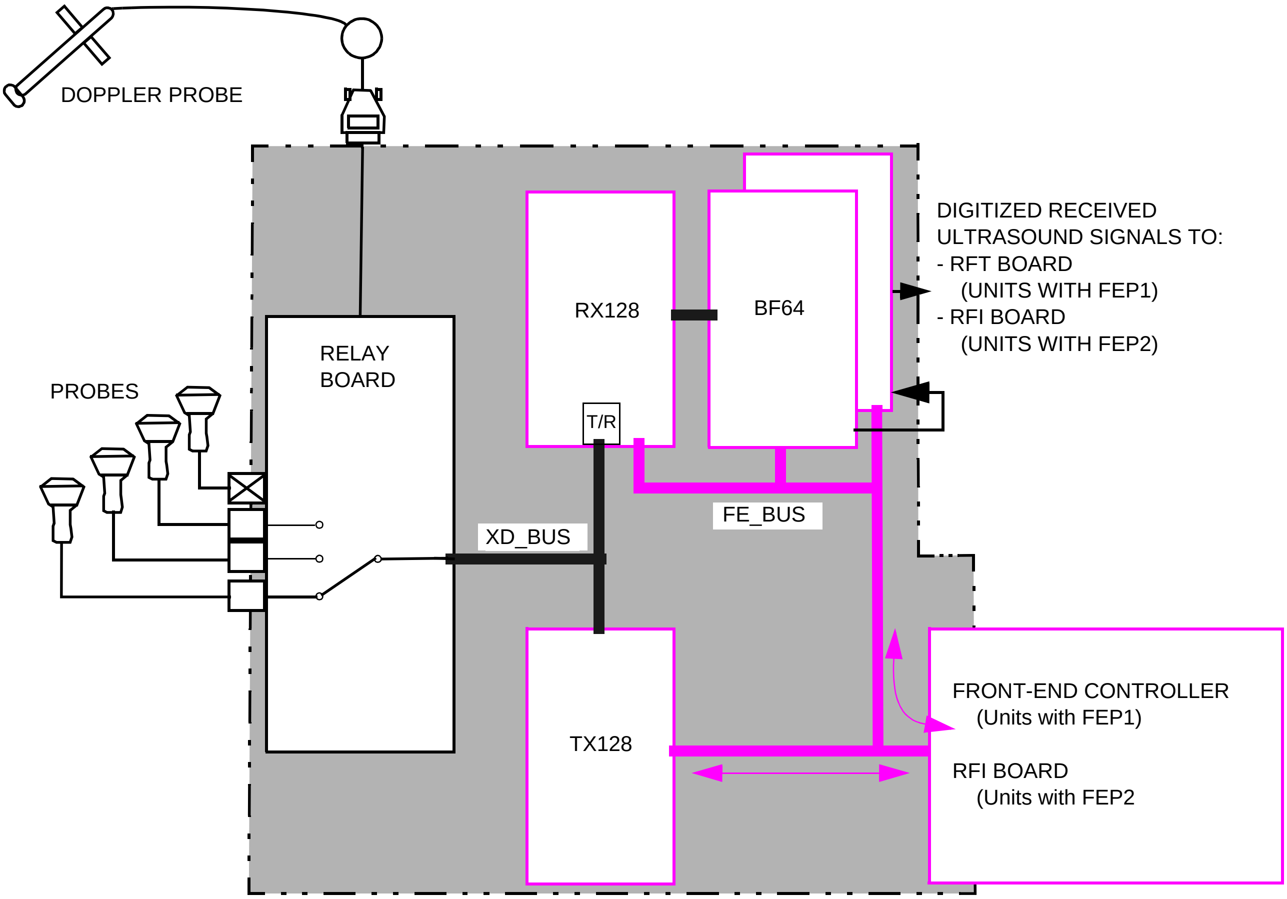

DOPPLER PROBE
PROBES
RELAY BOARD
RX128
BF64
T/R
XD_BUS
FE_BUS
TX128
DIGITIZED RECEIVED ULTRASOUND SIGNALS TO:
- RFT BOARD
(UNITS WITH FEP1)
- RFI BOARD
(UNITS WITH FEP2)
FRONT-END CONTROLLER
(Units with FEP1)
RFI BOARD
(Units with FEP2

Figure 5-8 The Ultrasound Transmitter and Receiver Control Signals

- The Front-End Controller (FEC) board (FEP1) or the Radio Frequency Interface (RFI) board (FEP2) controls the transmitter and receiver boards. FEC/RFI loads all parameters to the TX and Beam Former RAMs, it reads the probe identification, selects probe connector on Relay board and controls the high voltage multiplexer in linear and convex probes.
  In addition the FEC/RFI generates:
  - the transmit trigger pulse for TX
  - a receive synchronization pulse (SYNC_L) used by Beam Formers and RF & Tissue Processor
  - a differential ATGC voltage used by RX
  - global 40 MHz system clocks and reset pulse (SRES).

5-3-9-6 Signal Path Out from the Beam Former Boards

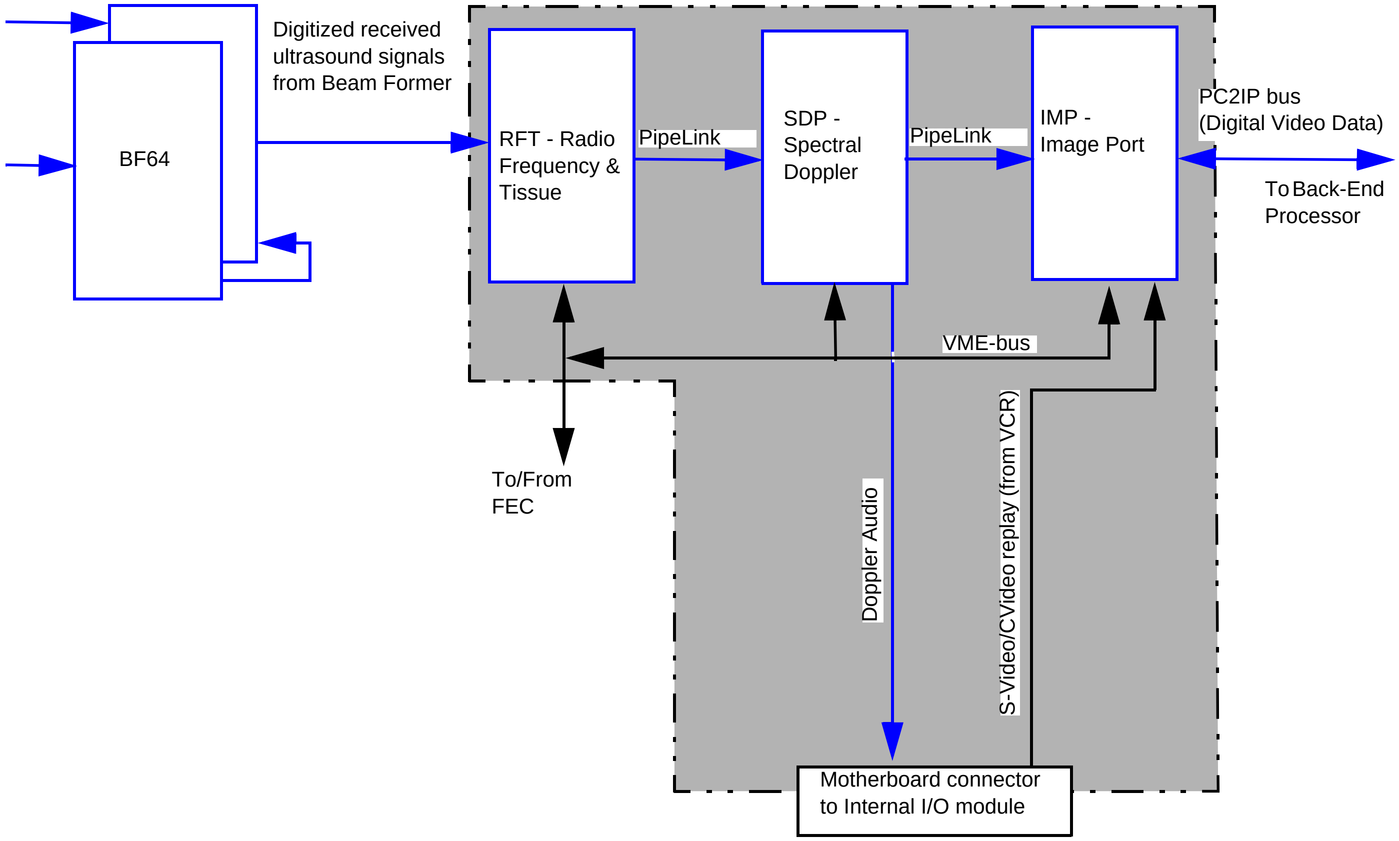

BF64
Digitized received ultrasound signals from Beam Former
RFT - Radio Frequency & Tissue
PipeLink
SDP - Spectral Doppler
PipeLink
IMP - Image Port
PC2IP bus (Digital Video Data)
To Back-End Processor
VME-bus
To/From FEC
Doppler Audio
S-Video/CVideo replay (from VCR)
Motherboard connector to Internal I/O module

Figure 5-9 Receiver Signal Path

- The output from the BF#2's Beamadders is fed to the RF and Tissue Processor board (RFT) on units with Front-End version 1, and to the Radio Frequency Interface (RFI) board on units with Front-End version 2.

5-3-10 Transmitter Board, TX128-5 (version introduced for BT'05)

5-3-10-1 General Description

The Transmitter board (TX128) contains 128 individually controlled transmit channels and provides transmit pulses via the XDBUS board to the Relay board and then to the transducer array (the probes).

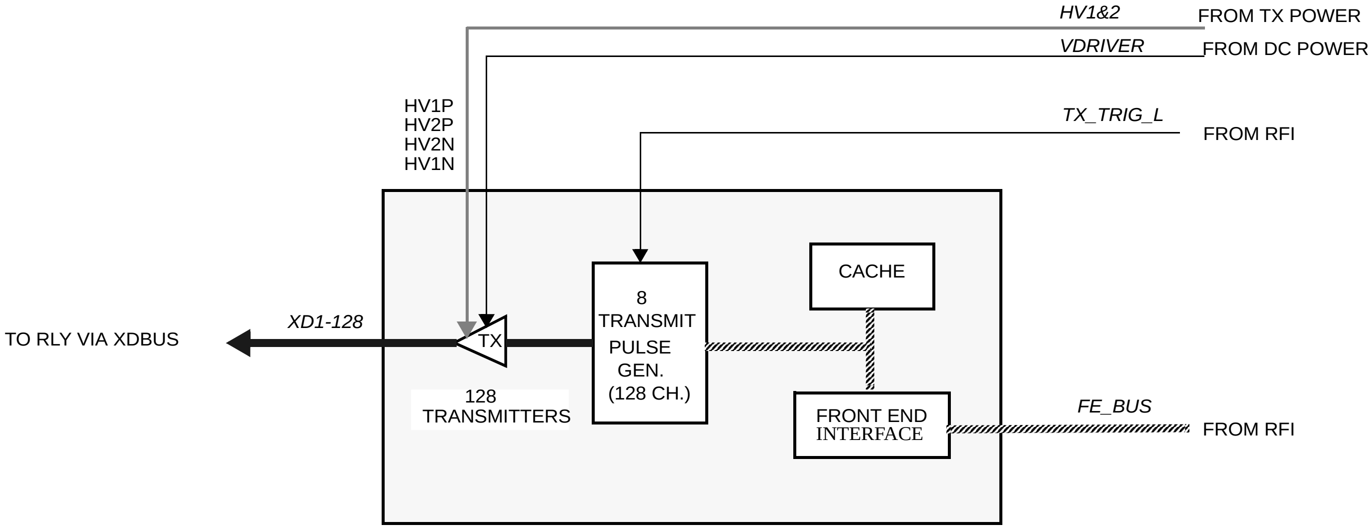

HV1&2
FROM TX POWER
VDRIVER
FROM DC POWER
TX_TRIG_L
FROM RFI
HV1P
HV2P
HV2N
HV1N
CACHE
8
TRANSMIT
PULSE
GEN.
(128 CH.)
TO RLY VIA XDBUS
XD1-128
TX
128
TRANSMITTERS
FRONT END
INTERFACE
FE_BUS
FROM RFI

Figure 5-10 Block Diagram for the TX128 board

Frequency-, delay- and pulswidth parameters for the TX128 board are received on the FE_BUS from the Radio Frequency Interface (RFI). The parameters are decoded and stored in the cache.

A pulse, TX_TRIG_L, trigs the Transmit Pulse Generators. The transmit pulses are then amplified to the correct level in the 128 TX transmitters.

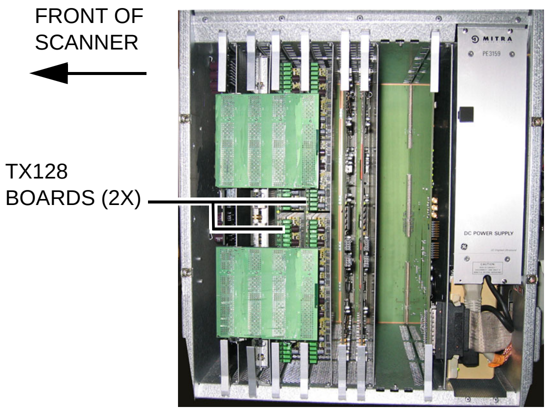
High Voltage 1 and High Voltage 2 from the TX Power supplies the TX Transmitters with the needed voltages to generate the correct power.

The VDRIVER voltage is used by the TX Drivers (drivers for the TX transmitters).

Two TX128 boards are used on units with the 3D option.

5-3-10-2 Location in the Unit

NOTICE Please be careful about the positions when replacing the TX card and the RX card. The position of the two cards are interchanged between FEP1 and FEP2.



FEP2 with two TX boards

Figure 5-11 TX128-5 Board: Location in Unit

5-3-10-3 Input DC Voltages

Table 5-4 Input, DC Voltages

INPUT	DESCRIPTION	CONNECTOR-PIN#	CONNECTION FROM
+6 Va	DC voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	J7-A22,B22,C22,D22,E22	DC Power Supply > Backplane
+15 Va	DC voltage, distributed via Motherboard (Backplane).	J6-C20,D20,E20 J7-A18,A19,A20	DC Power Supply > Backplane
-5 Va	DC voltage, distributed via Motherboard (Backplane).	J6-C3,D3,E3	DC Power Supply > Backplane
-15 V	DC voltage, distributed via Motherboard (Backplane).	J6-C1,D1,E1	DC Power Supply > Backplane
GND	Ground is distributed via Motherboard (Backplane).		DC Power Supply > Backplane
HV1	TX Voltage 1 Voltage can be programmed to vary from +/- 2.5 V to +/- 95V Used to drive the transmitters in 2D Mode and M Mode	HV1N: J6-A15 HV1P: J6-A24	TX Power Supply > Backplane
HV2	TX voltage 2 Voltage can be programmed to vary from +/- 2,5 V to +/- 95V Used to drive the transmitters in Doppler (CW/PW) mode and in Color Flow Mapping (CFM) mode	HV2N: J6-A18 HV2P: J6-A21	TX Power Supply > Backplane

5-3-10-4 Control Signals

Table 5-5 Input, Control Signals

INPUT	DESCRIPTION	CONNECTOR-PIN#	CONNECTION FROM
FE_D0-15	Front-End Data bus, Digital TTL	J1	RFI > Backplane
FE_PA0-9	Front-End Page Address bus, Digital TTL	J1	RFI > Backplane
FE_SA0-5	Front-End Device Select Address bus, Digital TTL	J1	RFI > Backplane
TX_TRIG_L	Transmit trigger, Digital TTL	J1-D4	RFI > Backplane

5-3-10-5 Outputs

Table 5-6 Output TX pulses

OUTPUT	DESCRIPTION	CONNECTED TO
XD1 - 128	128 transmitter channels via the connectors to the XD Bus Board	TX128 > XD Bus Board > Relay Board

5-3-10-6 Fuses, Jumpers and Dip-switches

None

5-3-10-7 LEDs on the TX128 board

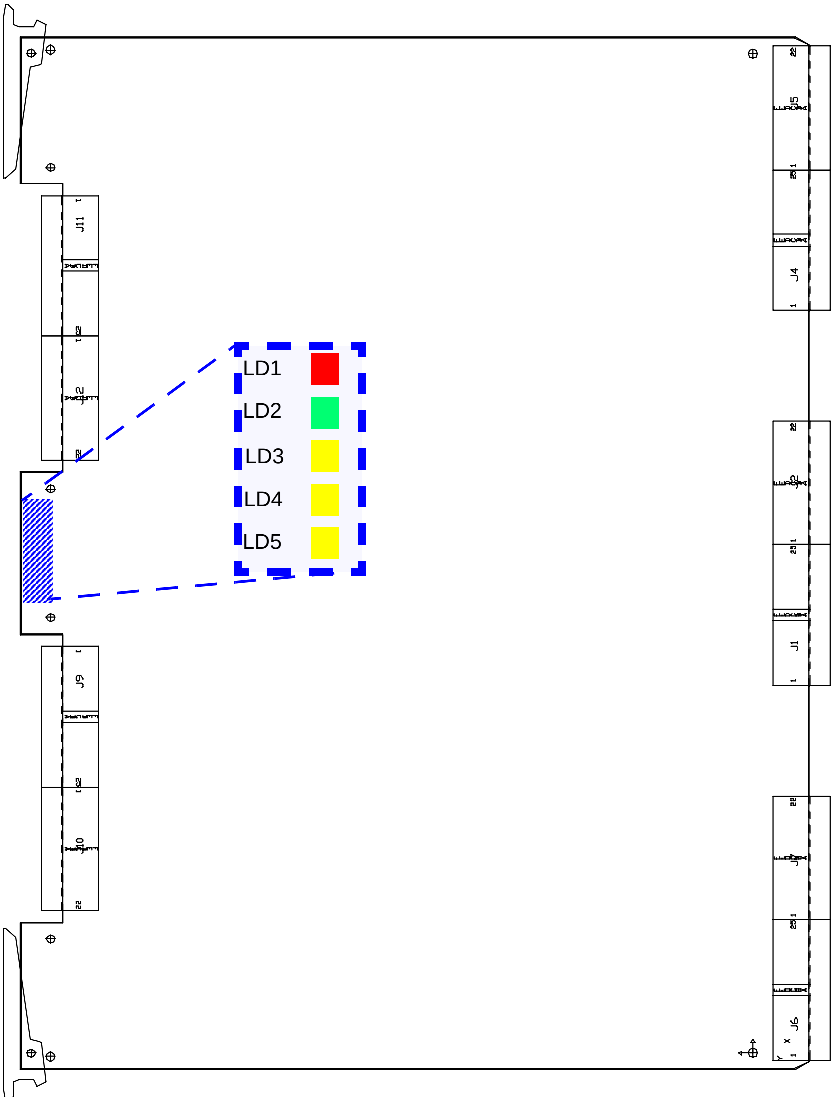


Figure 5-12 TX128 Board: LEDs

Table 5-7 LEDs on the TX128 Board

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟥 - Red	Board Failure	Normally OFF
LD2	🟩 - Green	Board OK	Normally ON
LD3	🟨 - Yellow	Front-End Bus Protocol Error	Normally OFF
LD4	🟨 - Yellow	Scan	Normally OFF
LD5	🟨 - Yellow	Spare	Normally OFF

5-3-10-8 Test points on the TX128 board

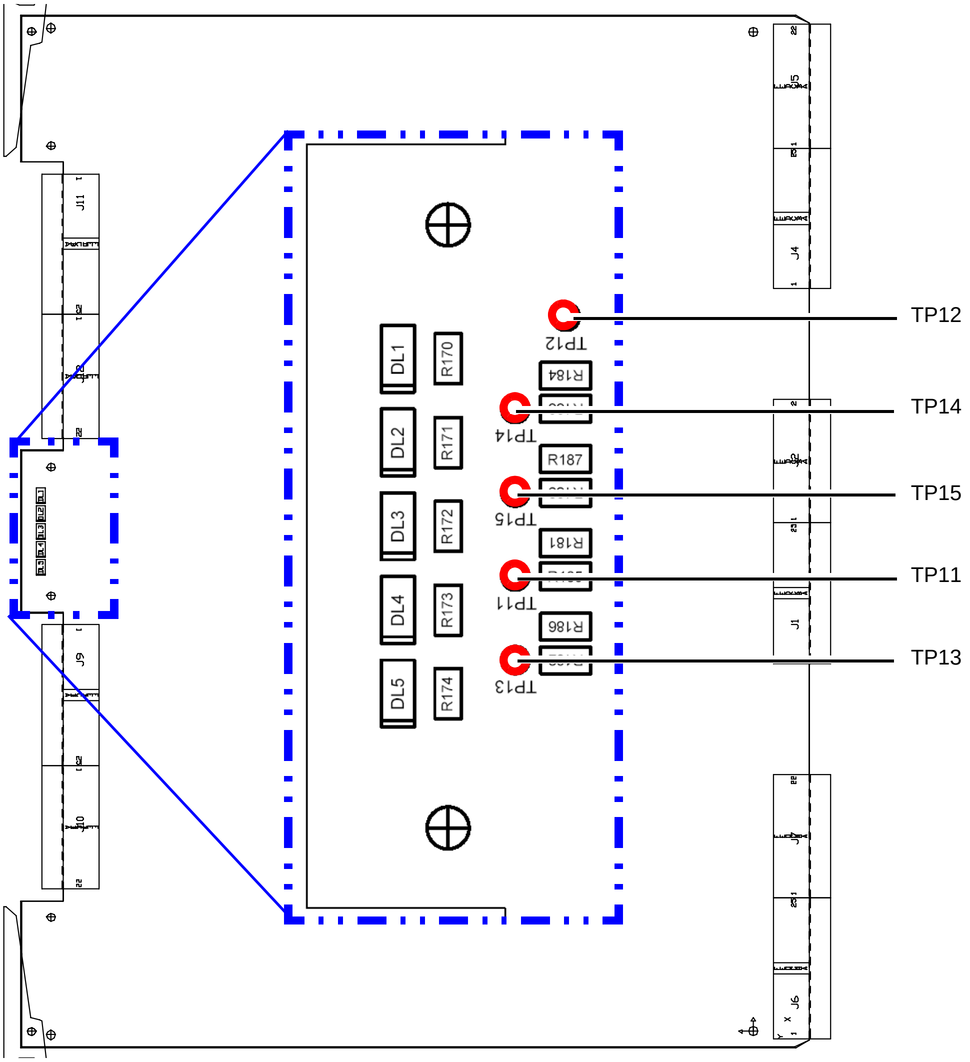

TP12
TP14
TP15
TP11
TP13
DL1
DL2
DL3
DL4
DL5
R170
R171
R172
R173
R174
R184
R187
R181
R186
J11
J9
J10
J4
J1

Figure 5-13 TX128 Board: Test points

NOTE: *The Voltages on these test points are approximately one tenth (1/10) of the TX Voltages used by the transmitter circuits. (The exact [calculated] value is 10/101). The measured values depends on selected scanning mode and the Acoustic Power adjustment.*

Table 5-8 Test points on the TX128-5 Board

TESTPOINT #	DESCRIPTION	TYPICAL VALUE
TP11	HV1+ /10	Between +0.25 VDC and +9.5 VDC
TP12	GROUND	0 VDC
TP13	HV1- /10	Between -0.25 VDC and -9.5 VDC
TP14	HV2- /10	Between -0.25 VDC and -9.5 VDC
TP15	HV2+ /10	Between +0.25 VDC and +9.5 VDC

5-3-11 Transmitter Board, TX128 (version used before BT'05)

5-3-11-1 General Description

The Transmitter board (TX128) contains 128 individually controlled transmit channels and provides transmit pulses via the XDBUS board to the Relay board and then to the transducer array (the probes).

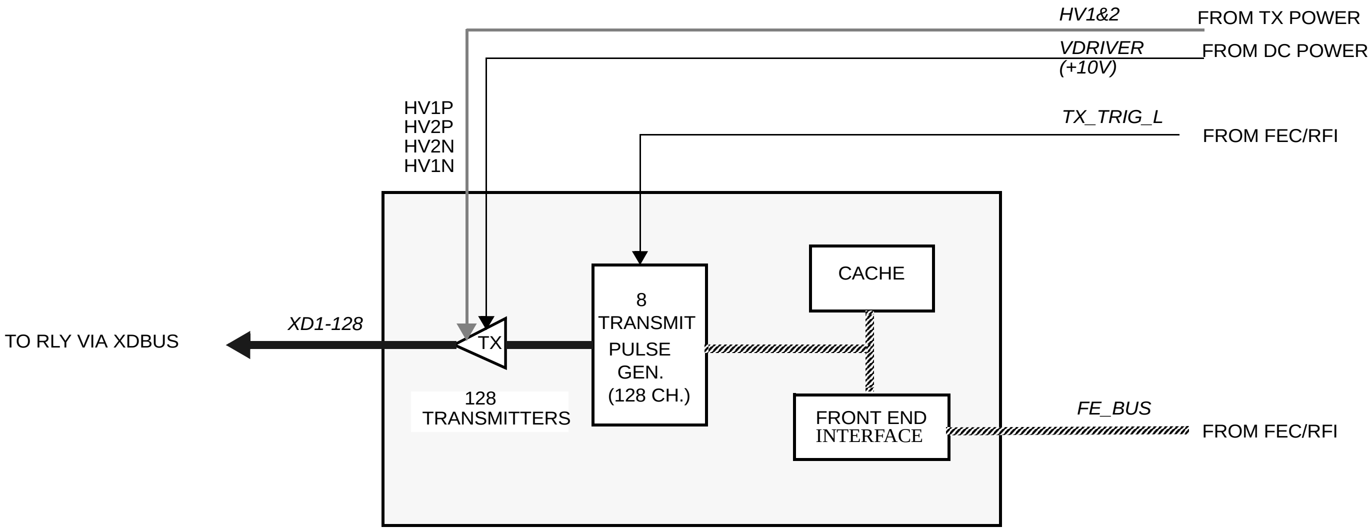

HV1&2
FROM TX POWER
VDRIVER
(+10V)
FROM DC POWER
TX_TRIG_L
FROM FEC/RFI
HV1P
HV2P
HV2N
HV1N
CACHE
8
TRANSMIT
PULSE
GEN.
(128 CH.)
TO RLY VIA XDBUS
XD1-128
TX
128
TRANSMITTERS
FRONT END
INTERFACE
FE_BUS
FROM FEC/RFI

Figure 5-14 Block Diagram for the TX128 board

Frequency-, delay- and pulswidth parameters for the TX128 board are received on the FE_BUS from the Front End Controller (FEC) on units with FEP1, and from the Radio Frequency Interface (RFI) on units with FEP2. The parameters are decoded and stored in the cache.

A pulse, TX_TRIG_L, trigs the Transmit Pulse Generators. The transmit pulses are then amplified to the correct level in the 128 TX transmitters.

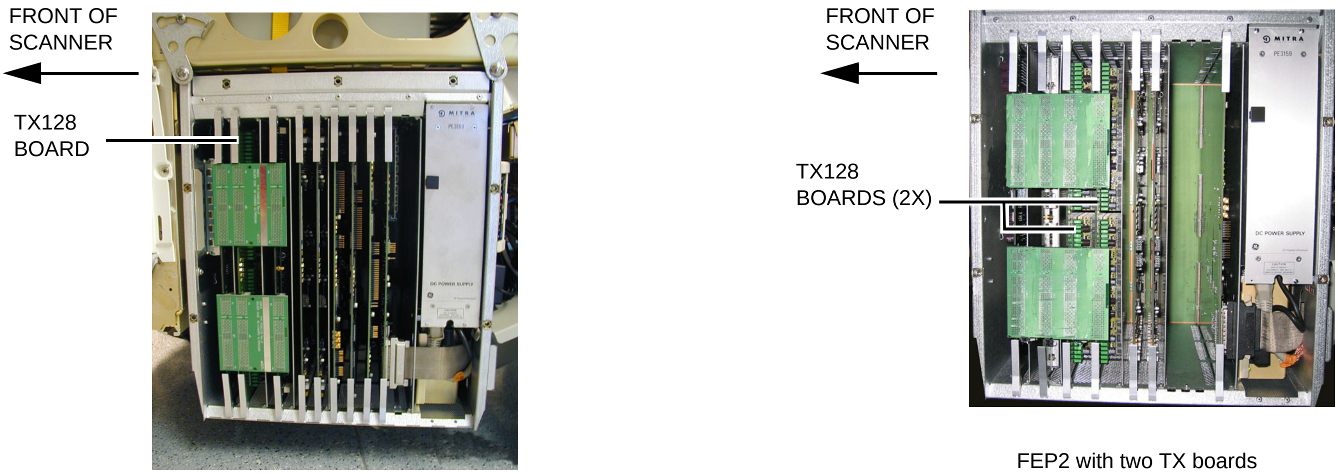
High Voltage 1 and High Voltage 2 from the TX Power supplies the TX Transmitters with the needed voltages to generate the correct power.

The VDRIVER voltage is used by the TX Drivers (drivers for the TX transmitters).

Two TX128 boards are used on units with the 3D option.

5-3-11-2 Location in the Unit

NOTICE Please be careful about the positions when replacing the TX card and the RX card. The position of the two cards are interchanged between FEP1 and FEP2.



FEP1

FEP2 with two TX boards

Figure 5-15 TX128 Board: Location in Unit

5-3-11-3 Input DC Voltages

Table 5-9 Input, DC Voltages

INPUT	DESCRIPTION	CONNECTOR-PIN#	CONNECTION FROM
+6 Va	DC voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	J7-A22,B22,C22,D22,E22	DC Power Supply > Backplane
+10 Va	DC voltage, distributed via Motherboard (Backplane). The + 10Va is only used by this board.	J6-C5,D5,E5	DC Power Supply > Backplane
-5 Va	DC voltage, distributed via Motherboard (Backplane).	J6-C3,D3,E3	DC Power Supply > Backplane
-15 V	DC voltage, distributed via Motherboard (Backplane).	J6-C1,D1,E1	DC Power Supply > Backplane
GND	Ground is distributed via Motherboard (Backplane).		DC Power Supply > Backplane
HV1	TX Voltage 1 Voltage can be programmed to vary from +/- 2.5 V to +/- 80V Used to drive the transmitters in 2D Mode and M Mode	HV1N: J6-A15 HV1P: J6-A24	TX Power Supply > Backplane
HV2	TX voltage 2 Voltage can be programmed to vary from +/- 2,5 V to +/- 40V Used to drive the transmitters in Doppler (CW/PW) mode and in Color Flow Mapping (CFM) mode	HV2N: J6-A18 HV2P: J6-A21	TX Power Supply > Backplane

5-3-11-4 Control Signals

Table 5-10 Input, Control Signals

INPUT	DESCRIPTION	CONNECTOR-PIN#	CONNECTION FROM
FE_D0-15	Front-End Data bus, Digital TTL	J1	Front-End Controller/RFI > Backplane
FE_PA0-9	Front-End Page Address bus, Digital TTL	J1	Front-End Controller/RFI > Backplane
FE_SA0-5	Front-End Device Select Address bus, Digital TTL	J1	Front-End Controller/RFI > Backplane
TX_TRIG_L	Transmit trigger, Digital TTL	J1-D4	Front-End Controller/RFI > Backplane

5-3-11-5 Outputs

Table 5-11 Output TX pulses

OUTPUT	DESCRIPTION	CONNECTED TO
XD1 - 128	128 transmitter channels via the connectors to the XD Bus Board	TX128 > XD Bus Board > Relay Board

5-3-11-6 Fuses, Jumpers and Dip-switches

None

5-3-11-7 LEDs on the TX128 board

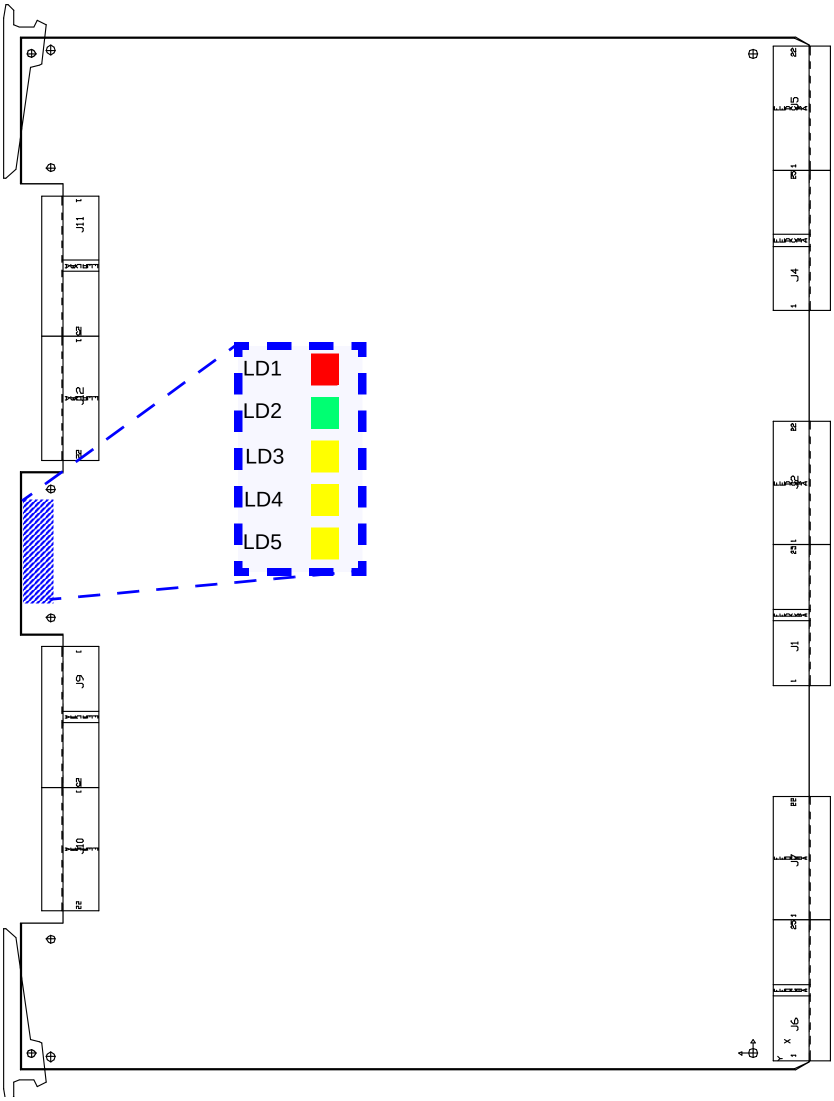


Figure 5-16 TX128 Board: LEDs

Table 5-12 LEDs on the TX128 Board

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟥 - Red	Board Failure	Normally OFF
LD2	🟩 - Green	Board OK	Normally ON
LD3	🟨 - Yellow	Front-End Bus Protocol Error	Normally OFF
LD4	🟨 - Yellow	Scan	Normally OFF
LD5	🟨 - Yellow	Spare	Normally OFF

5-3-11-8 Test points on the TX128 board

NOTE: *If the test points below have not been mounted, and you want to verify the TX voltages, you must use the TXP test, available via the Diagnostics Test Screen. Please refer to 7-8-3 "System Test" on page 7-66.*

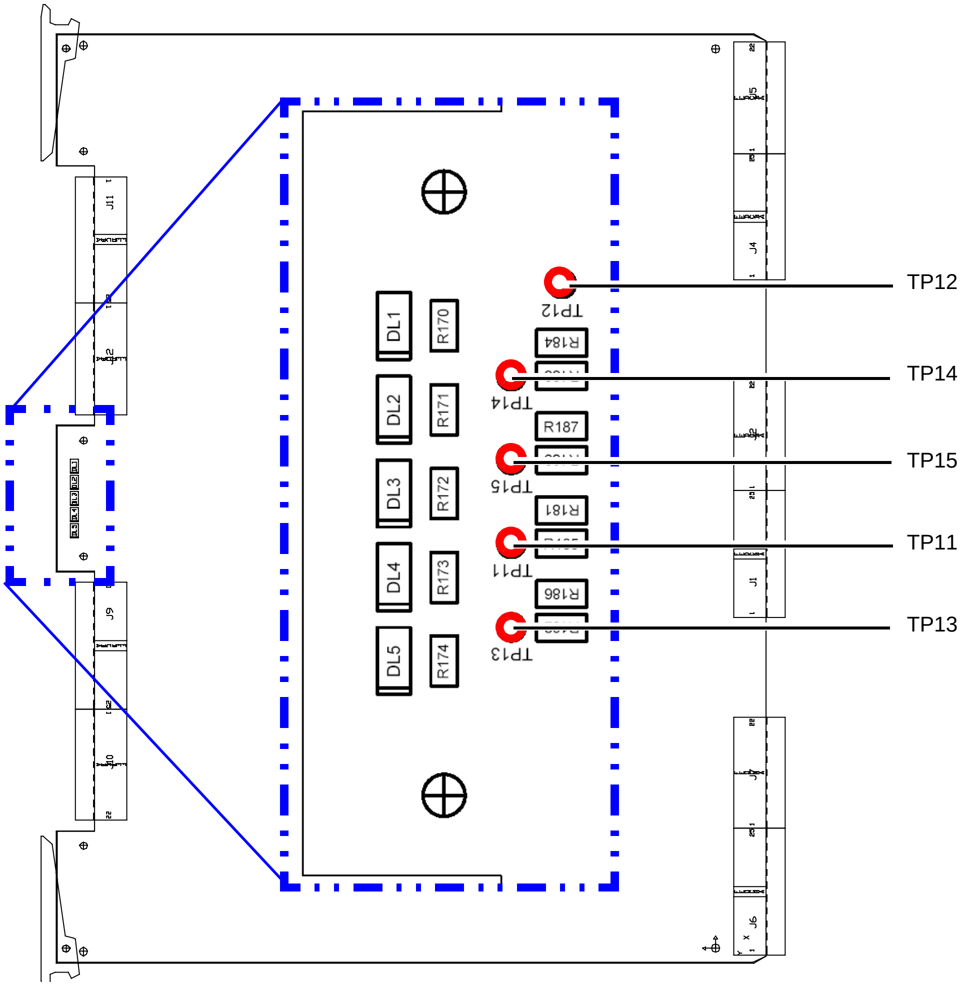

DL1
DL2
DL3
DL4
DL5
R170
R171
R172
R173
R174
R184
R187
R181
R186
TP12
TP14
TP15
TP11
TP13
J11
J9
J10
J5
J4
J2
J1
J6

Figure 5-17 TX128 Board: Test points

NOTE: *The Voltages on these test points are approximately one tenth (1/10) of the TX Voltages used by the transmitter circuits. (The exact [calculated] value is 10/101). The measured values depends on selected scanning mode and the Acoustic Power adjustment.*

Table 5-13 Test points on the TX128 Board

TESTPOINT #	DESCRIPTION	TYPICAL VALUE
TP11	HV1+ /10	Between +0.25 VDC and +8.0 VDC
TP12	GROUND	0 VDC
TP13	HV1- /10	Between -0.25 VDC and -8.0 VDC
TP14	HV2- /10	Between -0.25 VDC and -4.0 VDC
TP15	HV2+ /10	Between +0.25 VDC and +4.0 VDC

5-3-12 Transducer Bus Boards, XD BUS

5-3-12-1 General Description

The two XD BUS Boards plug into the rear edge connectors on the Relay Board, the TX128 Board(s) and on the RX-128 Board.

FEP2 ONLY: The XD Bus boards used on units with two TX boards, with 4D (RT3D), are not backward compatible and cannot be used on units with one TX card (without 4D (RT3D)). And the XD Bus board used on units with one TX board cannot be used on units with two TX boards.

FEP2 ONLY: The connectors for the Relay Board connection, are color coded to match the colors on the connectors on the Relay Board, to reduce the risk of mixing the two types of XD Bus boards.

The XD signals to and from the probes (via the Relay Board) are routed via this board.

⚠ **NOTICE** Two different versions of the XD Bus boards are used due to the different positions for TX board and RX board on FEP1 and FEP2. The two types can NOT be interchanged.

5-3-12-2 Location in the Unit

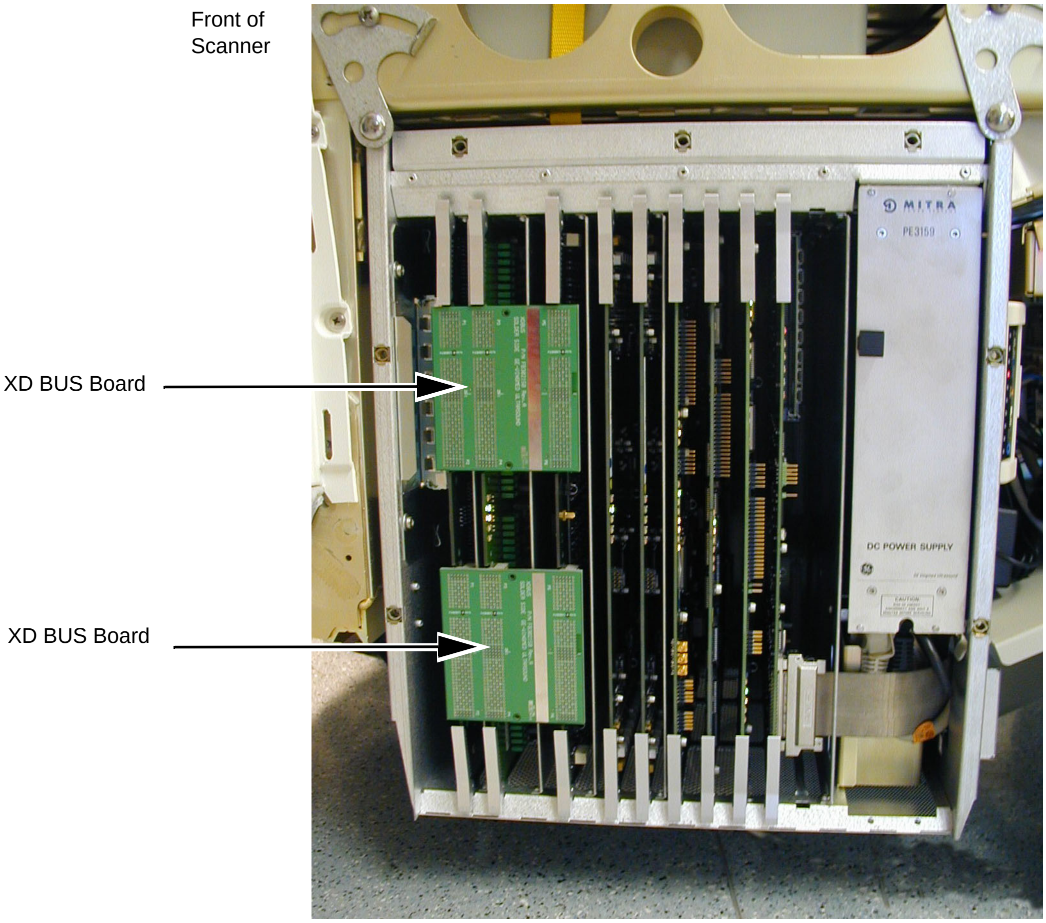


Figure 5-18 XD BUS Boards: Location in Unit with FEP1.

5-3-12-3 Input Signals

Table 5-14 Input Signals

INPUT	DESCRIPTION	CONNECTION FROM
XD1 - XD128	Back scattered echo signals (Receive Mode) and Transmitter pulses (Transmit Mode)	Active Probe via Relay board in Receive Mode TX128 in Transmit Mode.

5-3-12-4 Output Signals

Table 5-15 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
XD1 - XD128	Transmitter pulses (Transmit Mode) and Back scattered echo signals (Receive Mode)	Active Probe via Relay board in Transmit Mode RX-128 in Receive Mode.

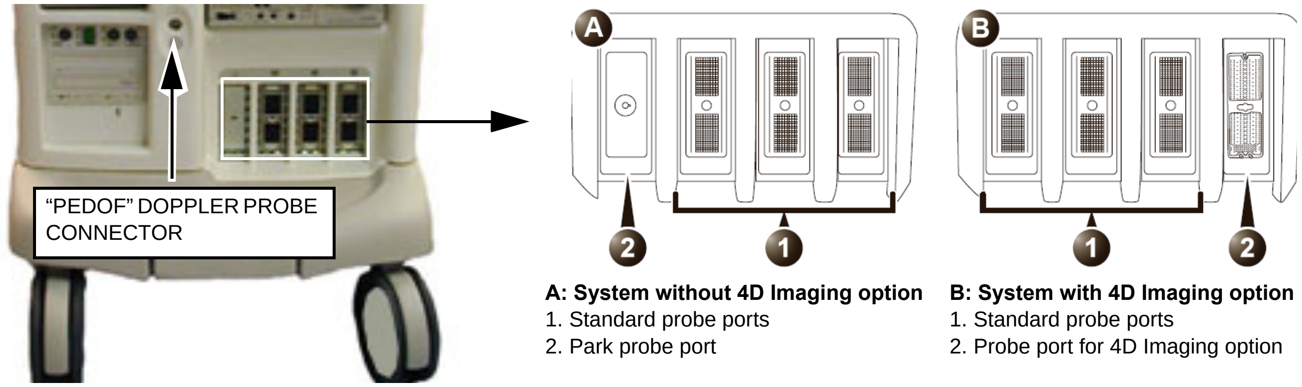
5-3-12-5 Fuses, Jumpers, Dip-switches and LEDs

None

5-3-13 Relay Board (RLY)

5-3-13-1 General Description

The Relay Board hosts the connectors for the probes.



A: System without 4D Imaging option
1. Standard probe ports
2. Park probe port

B: System with 4D Imaging option
1. Standard probe ports
2. Probe port for 4D Imaging option

Figure 5-19 Probe Connectors

- On systems without 4D (RT3D), the Relay Board has three PA probe connectors plus a "blind" PA slot used to park a fourth probe.
- On systems with 4D (RT3D), the Relay Board has four probe connectors. The three leftmost connectors are used for PA probes, the fourth connector is used for the 4D probe.

The Doppler (Pedof) connector, on the front of the Vivid 7, is connected to the Relay board via an internal cable.

- In receiving mode, the Relay Board connects the transducer channels from the selected probe to the RX and TX boards via the XDBUS.
- The Relay Board routes the TX power supplies to the active probe.
- It also routes the Probe Multiplexer Control Signal to the active probe.
- **FEP2 ONLY:** The connectors for the XDBUS connection, are color coded to match the colors on the connectors on the XD BUS Board, to reduce the risk of using the wrong type of XD Bus boards.

5-3-13-2 Location in the Unit

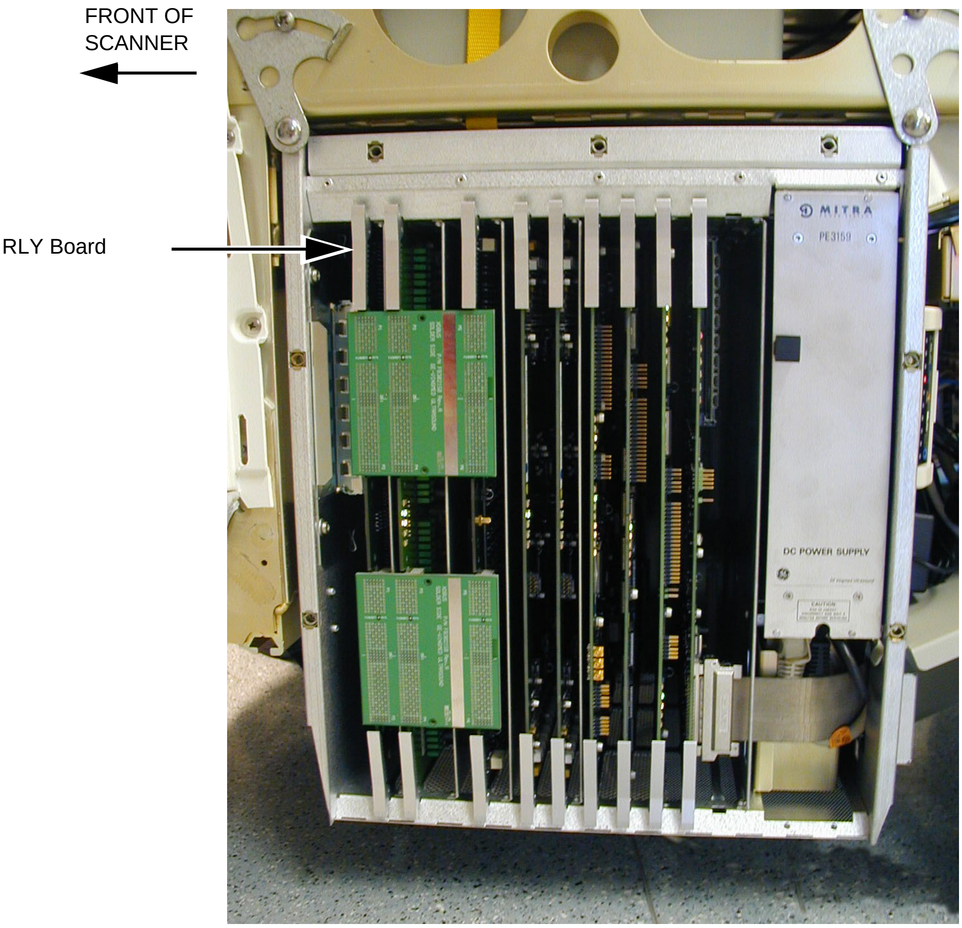

FRONT OF SCANNER
RLY Board
MITRA
PE3150
DC POWER SUPPLY

Figure 5-20 RLY Board: Location in Unit

5-3-13 Relay Board (RLY) (cont'd)

5-3-13-3 DC Voltages

Table 5-16 DC Output Voltages, Plug P3 & P4

INPUT	DESCRIPTION	CONNECTED FROM
+ 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits	DC Power Supply > Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	DC Power Supply > Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply > Backplane

5-3-13-4 Input Signals

Table 5-17 Input Signals

INPUT	DESCRIPTION	CONNECTION FROM
EL1-128	Received signals (echoes) and Transmitted pulses (1 of 3 probe connectors)	The active probe

5-3-13-5 Control Signals

Table 5-18 Control Signals

INPUT	DESCRIPTION	CONNECTION FROM
Front-End Data Bus	Digital data bus used for control of the boards in the Front-End	RLY > Backplane > FEC
Probe MUX Control	Probe Configuration	RLY > Backplane > FEC

5-3-13-6 Output Signals

Table 5-19 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
XD1 - 128	128 signals to TX-128 and RX-128	XD Bus Boards
CW or PW TX	CW or PW Doppler transmitter pulses	Stand Alone Doppler probe
CW or PW RX	CW or PW Doppler RX signals (echoes)	Stand Alone Doppler probe

5-3-13-7 Fuses, Jumpers, Dip-switches and LEDs

None

5-3-14 Receiver Board, RX-128

5-3-14-1 General Description

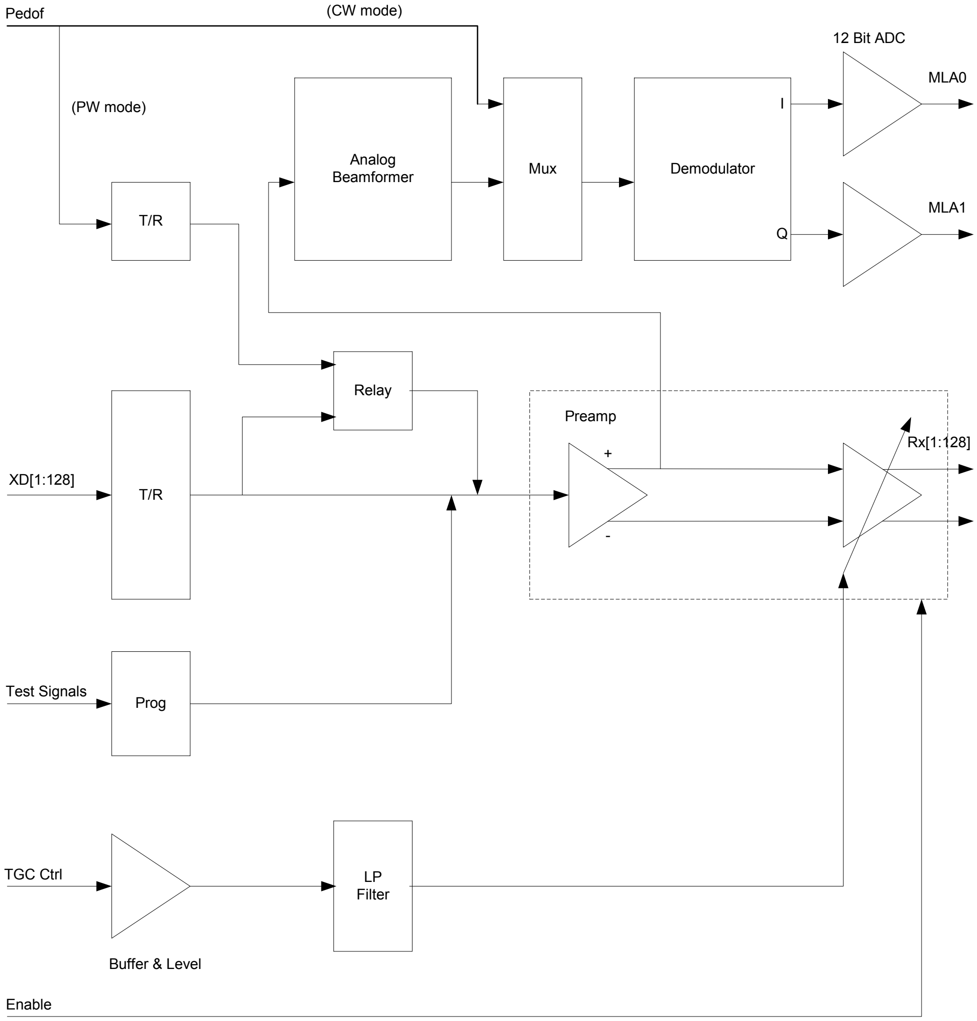

Pedof
(CW mode)
(PW mode)
12 Bit ADC
MLA0
MLA1
Analog Beamformer
Mux
Demodulator
I
Q
T/R
Relay
Preamp
+
-
Rx[1:128]
XD[1:128]
T/R
Test Signals
Prog
TGC Ctrl
Buffer & Level
LP Filter
Enable

Figure 5-21 RX128 Block Diagram

5-3-14-2 Signals From Active Probe

- The RX-128 Board has 128 identical receive channels (XD1-XD128).
- The signal in each channel is fed via a Transmit/Receive (T/R) switch to a preamplifier.
- From the preamplifier the signal goes to a Time Controlled Gain (TGC) amplifier used to equalize the signal strength from the near field, the mid field and the far field.
- The output channels (RX1 - RX128) are then output via the backplane to the Beamformer boards.

5-3-14-3 Signals from Pedof Probe

The Pedof signals are connected via two dedicated channels on the XD bus

PW Mode

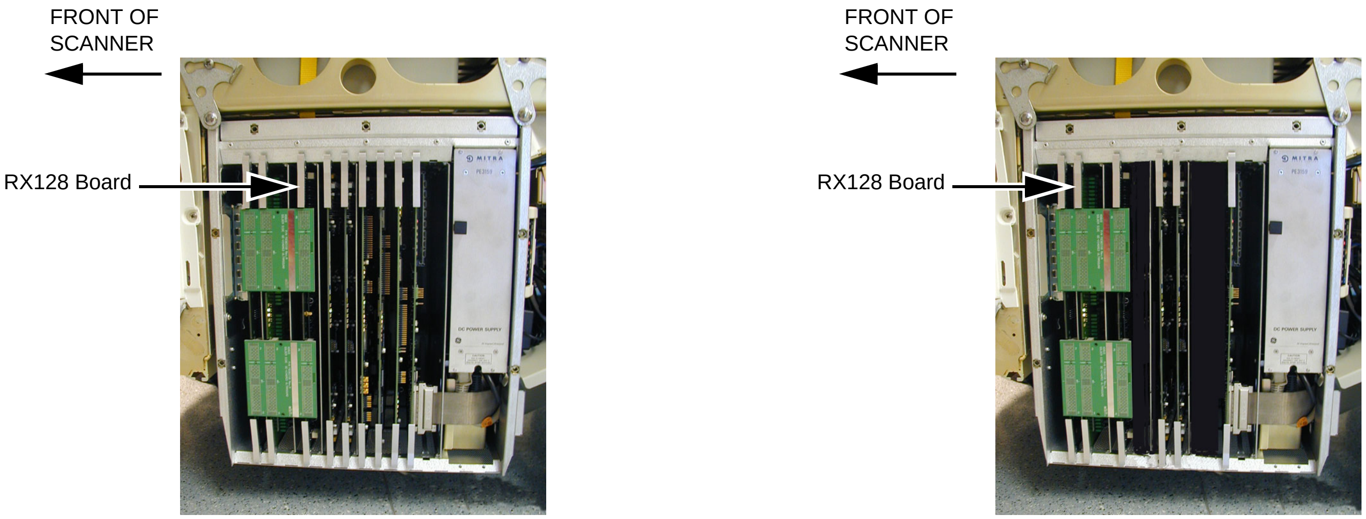
- The Pedof signals (two channels) are fed via a Transmit/Receive (T/R) switch and relays to three preamplifiers for each Pedof channel.
- From the preamplifiers the signal go to Analog Beamformers.
- From the Analog Beamformers the signals are fed via a multiplexer for demodulating.
- The demodulated (I and Q) signals are then converted from analog to digital in 12 bit A/D converters.
- The output from the A/D converters (MLA0 and MLA1) are then output to the Beamformer boards.

CW Mode

- In CW mode, the CW signal is amplified by a dedicated preamplifier (not shown in block diagram) before multiplexing and demodulating.
- The demodulated (I and Q) signals are then converted from analog to digital in 12 bit A/D converters.
- The output from the A/D converters (MLA0 and MLA1) are then output to the Beamformer boards.

5-3-14-4 Location in the Unit

NOTICE Please be careful about the positions when replacing the TX card and RX card. The position of the two cards are interchanged between FEP1 and FEP2.



Front-End Rack Version 1

Front-End Rack Version 2

Figure 5-22 RX128 Board: Location in Unit

5-3-14 Receiver Board, RX-128 (cont'd)

5-3-14-5 DC Voltages

Table 5-20 DC Input Voltages, Plug P3 & P4

INPUT	DESCRIPTION	CONNECTED TO
+ 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
+15 V	DC output voltage, distributed via Motherboard (Backplane)	DC Power Supply via Backplane
- 15 V	DC output voltages, distributed via Motherboard (Backplane)	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-14-6 Input Signals

Table 5-21 Input Signals

INPUT	DESCRIPTION	CONNECTION FROM
XD1 - XD128	Signals containing the received back-scattered echoes from the active probe.	Active Probe > Relay Board > XD Bus Boards > RX128 board
PEDOF	Signals containing the received back-scattered echoes from PEDOF probe	Pedof probe > Relay Board > XD Bus Boards > RX128 board
ATGCVP/ATGCVN	TGC Control Voltages	FEC Board/RFI Board > FE Bus > RX128 board
Test SIG	Analog test signal	FEC Board/RFI Board > FE Bus > RX128 board

5-3-14-7 Output Signals

Table 5-22 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
RX1 - RX128	128 RX signals (echoes)	Beam Former Boards via Backplane

5-3-14-8 Fuses

None

5-3-14-9 Jumpers and Dip-switches

None

5-3-14 Receiver Board, RX-128 (cont'd)

5-3-14-10 LEDs

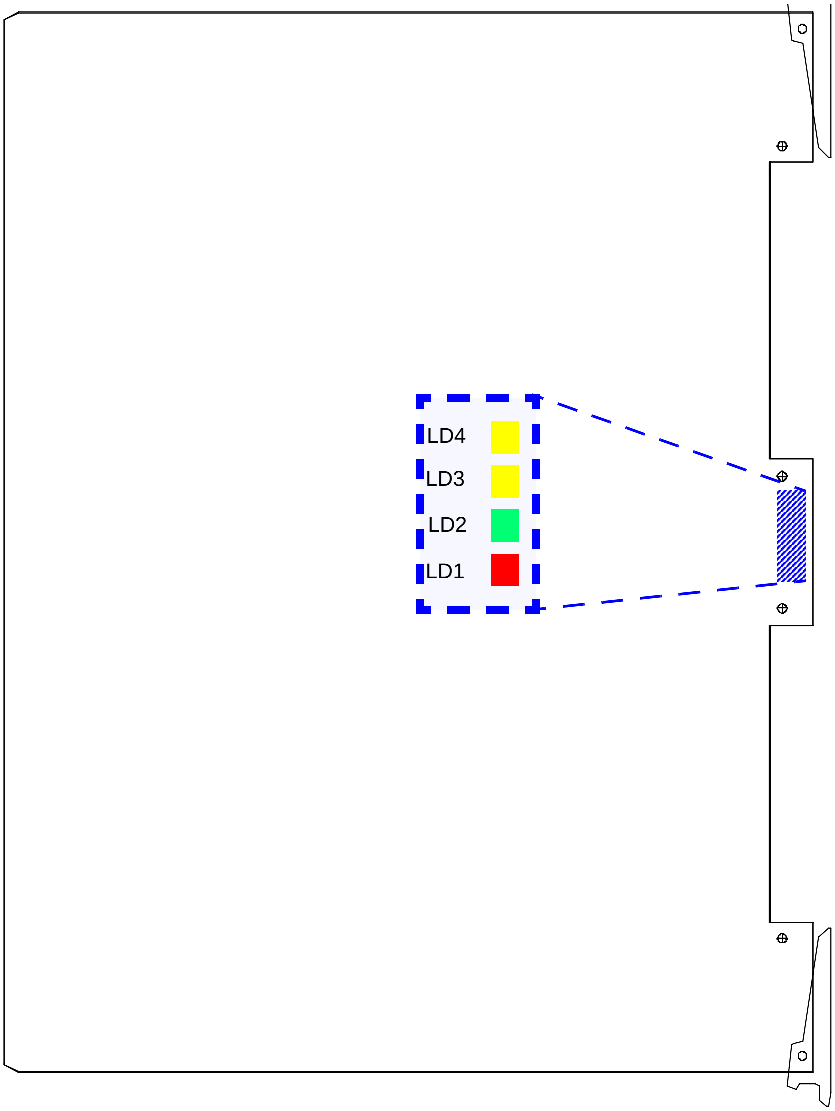


Figure 5-23 RX-128: LEDs (on the Solder Side of the Board)

Table 5-23 RX-128: LEDs (on the Solder Side of the Board)

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟥 - Red	Board Failure	Normally OFF
LD2	🟩 - Green	Board OK	Normally ON
LD3	🟨 - Yellow	Spare	Normally OFF
LD4	🟨 - Yellow	Spare	Normally OFF

5-3-15 Beam Former Board(s), BF-64

5-3-15-1 General Description, BF-64 boards

The BF64 board converts the analog RF-input signal from 64 receiver channels into digital form and performs receiver focusing and steering by digital delay.

All digital signal processing to filter and delay each channel is performed in an Application Specific Integrated Circuit (ASIC) named FOC32.

The output of this board is either connected to a new BF64 board (to increase the number of channels) or to the RFT or RFI board for digital RF processing.

5-3-15-2 Location in Units

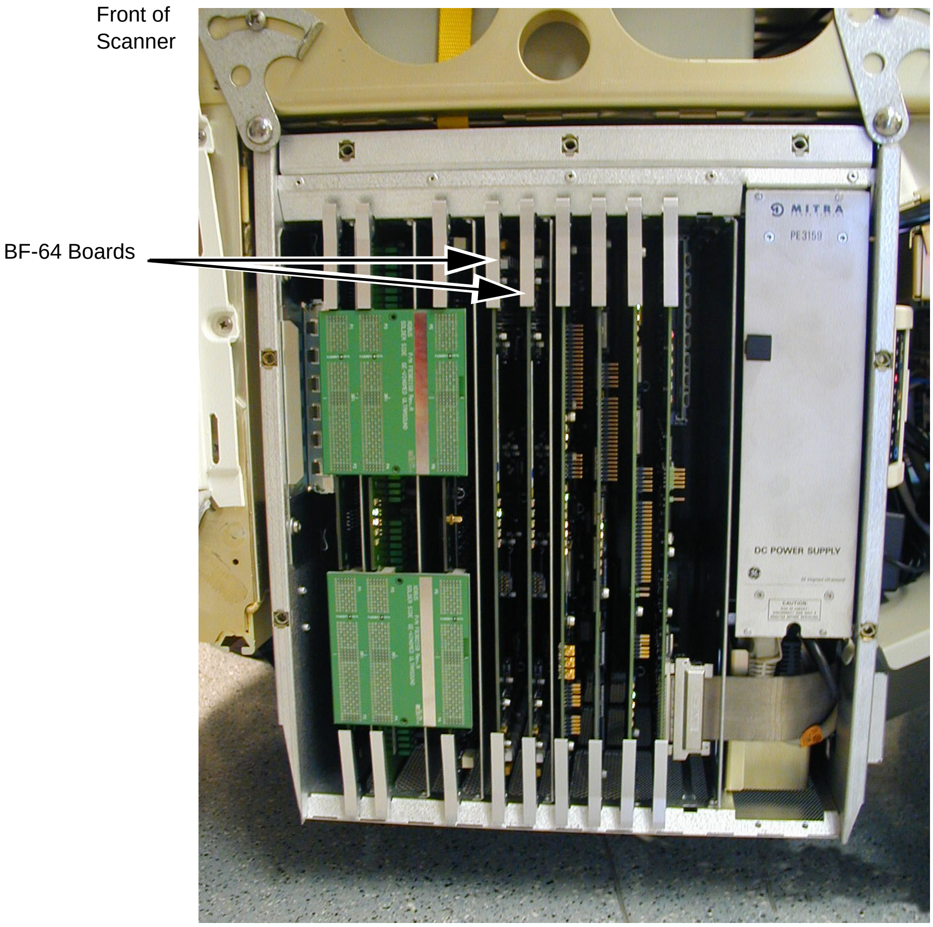


Figure 5-24 BF-64 Boards, Location in Units (FEP 1 shown in illustration)

5-3-15 Beam Former Board(s), BF-64 (cont'd)

5-3-15-3 DC Voltages

Table 5-24 DC Input Voltages

INPUT	DESCRIPTION	CONNECTED TO
+ 3.3 V	DC voltage, distributed via Motherboard (Backplane)	DC Power Supply via Backplane
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The "d" indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-15-4 Input Signals

Table 5-25 Input Signals

INPUT	DESCRIPTION	CONNECTION FROM
RX1 - RX128	Receiver signals	RX-128 board
FE Bus	Front-End Bus	FEC Board
MLA0 to MLA1	BF64 #1 ONLY: Digital data from analog CW beamformer on RX128 board BF64 #1 ONLY	RX128
MLA0 to MLA1 or MLA0 to MLA3	This input is used on BF64 #2: The output signal from previous board.	BF64 Board #1

5-3-15-5 Output Signals

Table 5-26 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
MLA0 to MLA1 or MLA0 to MLA3	This is the digital output from the board.	From BF64 #1: To BF64 #2. From BF64 #2: To RFT.

5-3-15-6 Fuses

None.

5-3-15 Beam Former Board(s), BF-64 (cont'd)

5-3-15-7 Dip-switches and Jumpers

None.

5-3-15-8 LEDs on BF64, Part Number FB200900

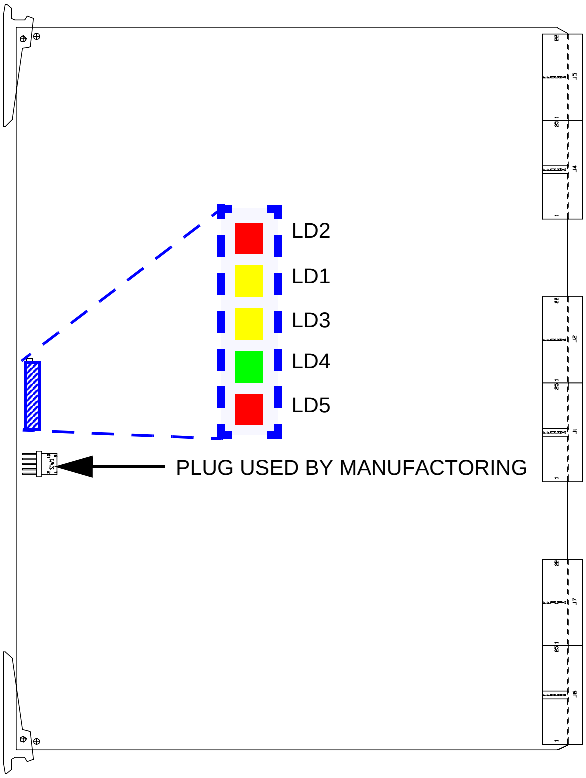


Figure 5-25 BF64, P/N: FB200900 - LEDs

Table 5-27 LEDs on the BF-64 Boards, P/N: FB200900

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟩 - Green	"OK". Board tested OK by System.	Normally ON
LD2	🟥 - Red	"ERROR". Board not initialized or an error has occurred	Normally OFF
LD3	🟨 - Yellow	Not Used	Normally OFF
LD4	🟨 - Yellow	Not Used	Normally OFF
LD5	🟥 - Red	"POWER ERROR". +5V and/or +2.5V is missing	Normally OFF

5-3-15-9 LEDs on BF64, Part Number: FC200100

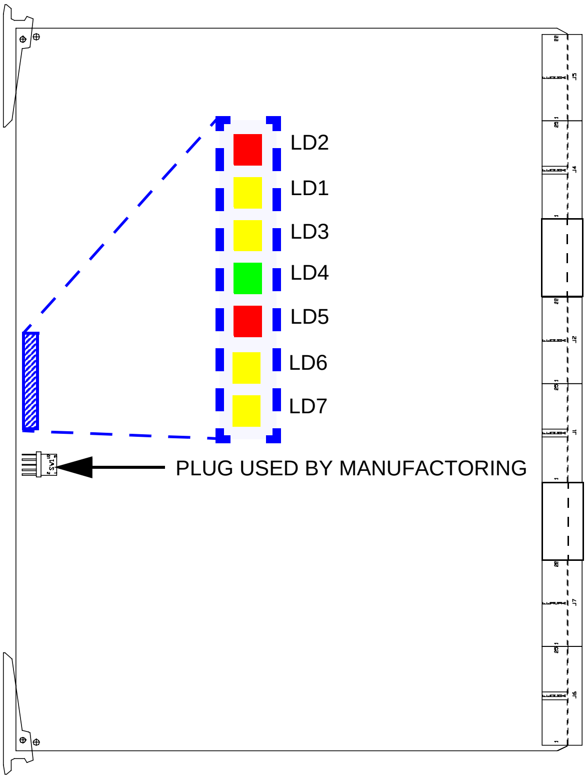


Figure 5-26 LEDs on BF64, P/N FC200100

Table 5-28 LEDs on BF-64 Boards, P/N FC200100

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD2	🟥 - Red	“ERROR”. Board not initialized or an error has occurred	Normally OFF
LD1	🟩 - Green	“OK”. Board tested OK by System.	Normally ON
LD3	🟨 - Yellow	Not Used	Normally OFF
LD4	🟨 - Yellow	Not Used	Normally OFF
LD5	🟥 - Red	“POWER ERROR”. +5V and/or +2.5V is missing	Normally OFF
LD6	🟨 - Yellow	Merger status indicator	Blinking
LD7	🟨 - Yellow	Merger status indicator	Blinking

5-3-16 Front-End Controller Board, FEC

NOTE: The Front-End Controller Board is only used in Front-End Rack version 1.
In units with Front-End Rack version 2, the RFI board replaces the functionality of this board, see: 5-3-21 "Radio Frequency Interface Board, RFI" on page 5-61.

5-3-16-1 General Description

The Front-End Controller Board controls the transmitter and receiver boards.

Most of the control is done through the Frond End Bus.

Main tasks done by the FEC board:

- System Master Clock generator
- Transmitter Control
- ATGC Control
- Receive Focusing Control
- Analog Test Signal Generator
- High Voltage Control and supervision
- Probe Sensing
- Control of Relay Board
- Temperature Sensing for TEE probes
- Step Motor Control for TEE probes
- Temperature Sensing for circulated air (System Temperature Surveillance)

5-3-16-2 System Temperature Surveillance

The FEC board monitors the temperature in the airflow at the air intake and in the airflow at the air outlet.

- If the temperature inside the system (at the air outlet) increases to 60 ^{o}C, a “High System Temperature” error will be displayed on the screen.
- If the temperature increase to 65 ^{o}C, the system will start an automatic shutdown.

The temperature will normally be recorded at startup, and then repeated every hour. This frequency will increase if the temperature exceeds the limit.

The temperature measurements make it possible to monitor the environmental conditions (temperatures) for the scanner and prevent overheating.

The temperature measurements are available in a temperature log available via the Service Platform. It is also available at D:\log\logfile-temp.txt.

5-3-16-3 Location in the Unit

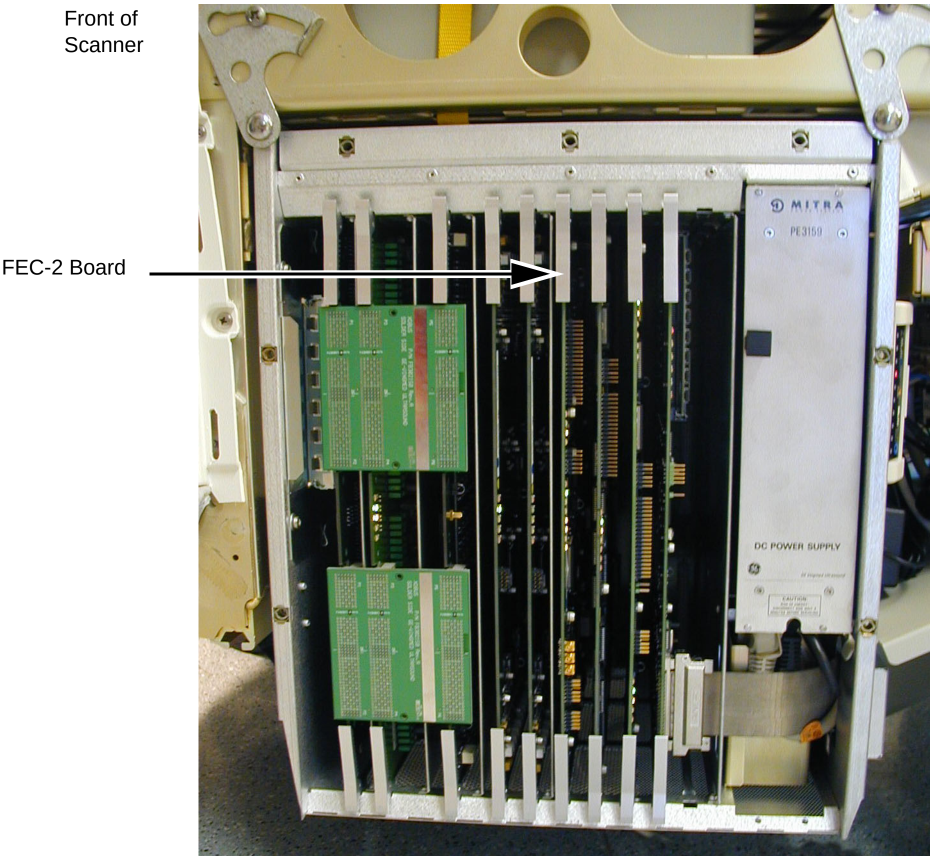

Front of Scanner
FEC-2 Board
MITRA
PE3159
DC POWER SUPPLY

Figure 5-27 FEC-2 Board: Location in Unit (Front-End Rack version 1, only)

5-3-16 Front-End Controller Board, FEC (cont'd)

5-3-16-4 Inputs

5-3-16-4-1 DC Voltages

Table 5-29 DC Input Voltages

INPUT	DESCRIPTION	CONNECTED TO
+ 3.3 Vd	DC output voltage, distributed via Motherboard (Backplane). The "d" indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The "d" indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
+ 15 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
- 15 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-16-4-2 Signal Inputs

Table 5-30 Signal Inputs

INPUT	DESCRIPTION	CONNECTION FROM
PRPRES	Probe Present	Relay Board
High Voltage V & I Sense	Indicates the voltages and currents from the TX Supply	TX Power
VME Bus	Used for communication with the rest of the system (not the Front-End Boards). Commands and data from the VME Bus can be routed via the Front-End bus to the other boards in the Front-End.	The Back-End Processor

5-3-16 Front-End Controller Board, FEC (cont'd)

5-3-16-5 Output

5-3-16-5-1 Output Signals

Table 5-31 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
TXTRIG_L	Starts the transmitter sequence	TX128 boards
SYNC_L	Signal used to synchronize the Beam Formers	BF64 boards
TSIG	Test Signal	RX-128 Board
ATGCVP/ATGCVN	Differential signals used to control TGC on the RX Board	RX-128 Board
TX Voltage Control	One serial data line and several select lines to the TX Supply	TX Supply

5-3-16-6 LEDs Description, Main Digital Signal Processor (DSP)

Table 5-32 FEC-2, Lower Batch of LEDs, Main DSP

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟥 - Red	Board Failure	Normally OFF
LD2	🟩 - Green	Board OK	Normally ON
LD3	🟨 - Yellow	System in scanning mode	ON when scanning OFF in Freeze
LD4	🟨 - Yellow	Probe Change	ON during probe change
LD5	🟨 - Yellow	No-Probe	OFF if no-probe has been selected
LD6	🟨 - Yellow	TX Overrange	OFF. ON if excessive TX Voltage is output Blinking, surveillance period
LD7	🟨 - Yellow	VME Access	ON when communicating with BEP.
LD8	🟨 - Yellow	DSP Running	BLINKING (1 Hz) "heartbeat"

5-3-16 Front-End Controller Board, FEC (cont'd)

5-3-16-7 LEDs Description, Slave DSP

Table 5-33 FEC-2, Upper Batch of LEDs, Slave DSP

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD27	🟨 - Yellow	Rack temperature surveillance	Blinking
LD28	🟨 - Yellow	TX Power surveillance	Blinking
LD29	🟩 - Green	Up and running	ON Blinking
LD30	🟥 - Ref	Failure or reprogramming	OFF

5-3-16-8 LEDs

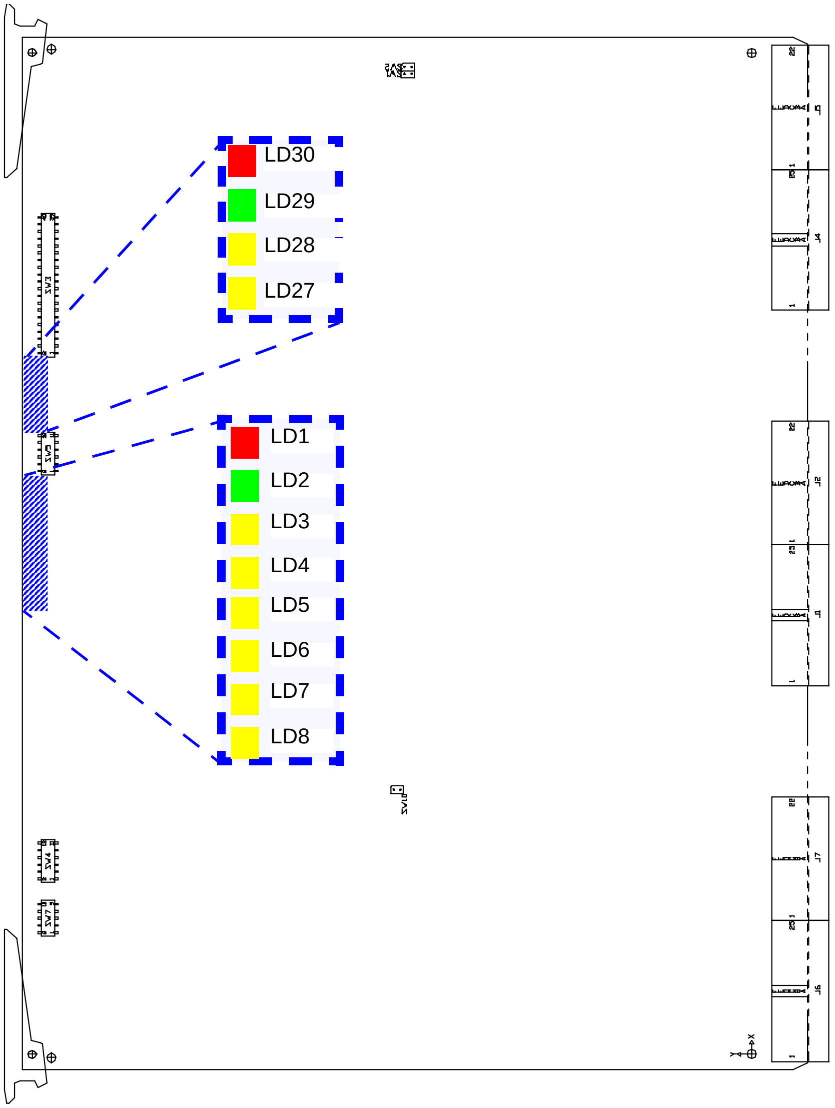


Figure 5-28 FEC-2, LEDs

5-3-16 Front-End Controller Board, FEC (cont'd)

5-3-16-9 Test points for DC Voltages

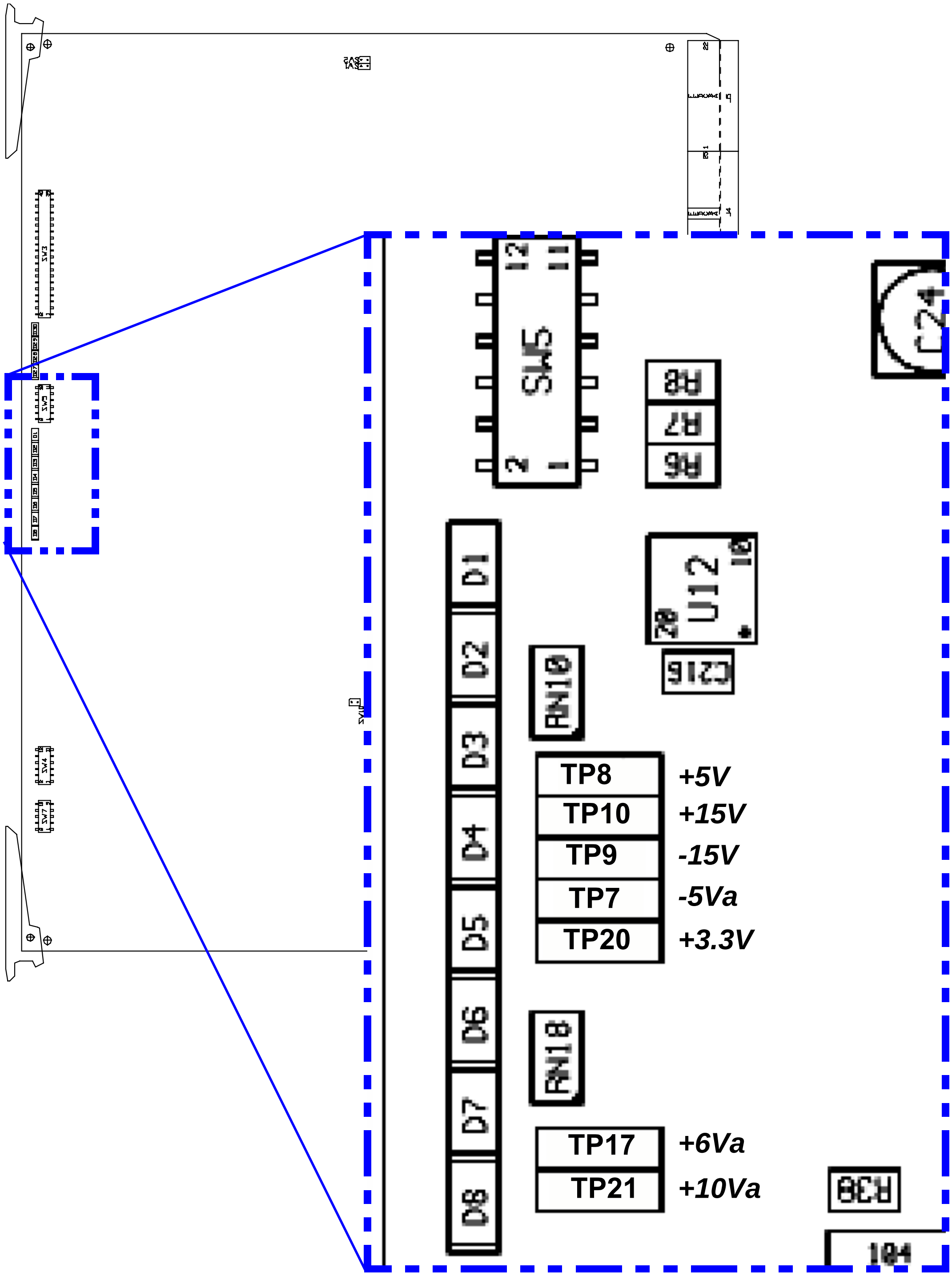

SW5
R8
R7
R6
C24
U12
C216
RN10
RN18
D1
D2
D3
D4
D5
D6
D7
D8
TP8 +5V
TP10 +15V
TP9 -15V
TP7 -5Va
TP20 +3.3V
TP17 +6Va
TP21 +10Va
R30
104

Figure 5-29 FEC-2, Test points for DC Voltages

5-3-16-10 Test Points for DC Voltages

See Figure 5-29 "FEC-2, Test points for DC Voltages" on page 5-42.

Table 5-34 Test points for DC Voltages

TEST POINT	DC VOLTAGE	ACCEPTABLE RANGE
TP 8	+5 V	+4.75 V to +5.25 V
TP 10	+15 V	+/- 10%
TP 9	-15 V	+/- 10%
TP 7	-5 Va	+/- 10%
TP 20	+3.3 Va	+/- 10%
TP 17	+6 Va	+/- 10%
TP 21	+10 Va	+/- 10%

5-3-16-11 Fuses and Dip-switches

None

5-3-16-12 Jumpers

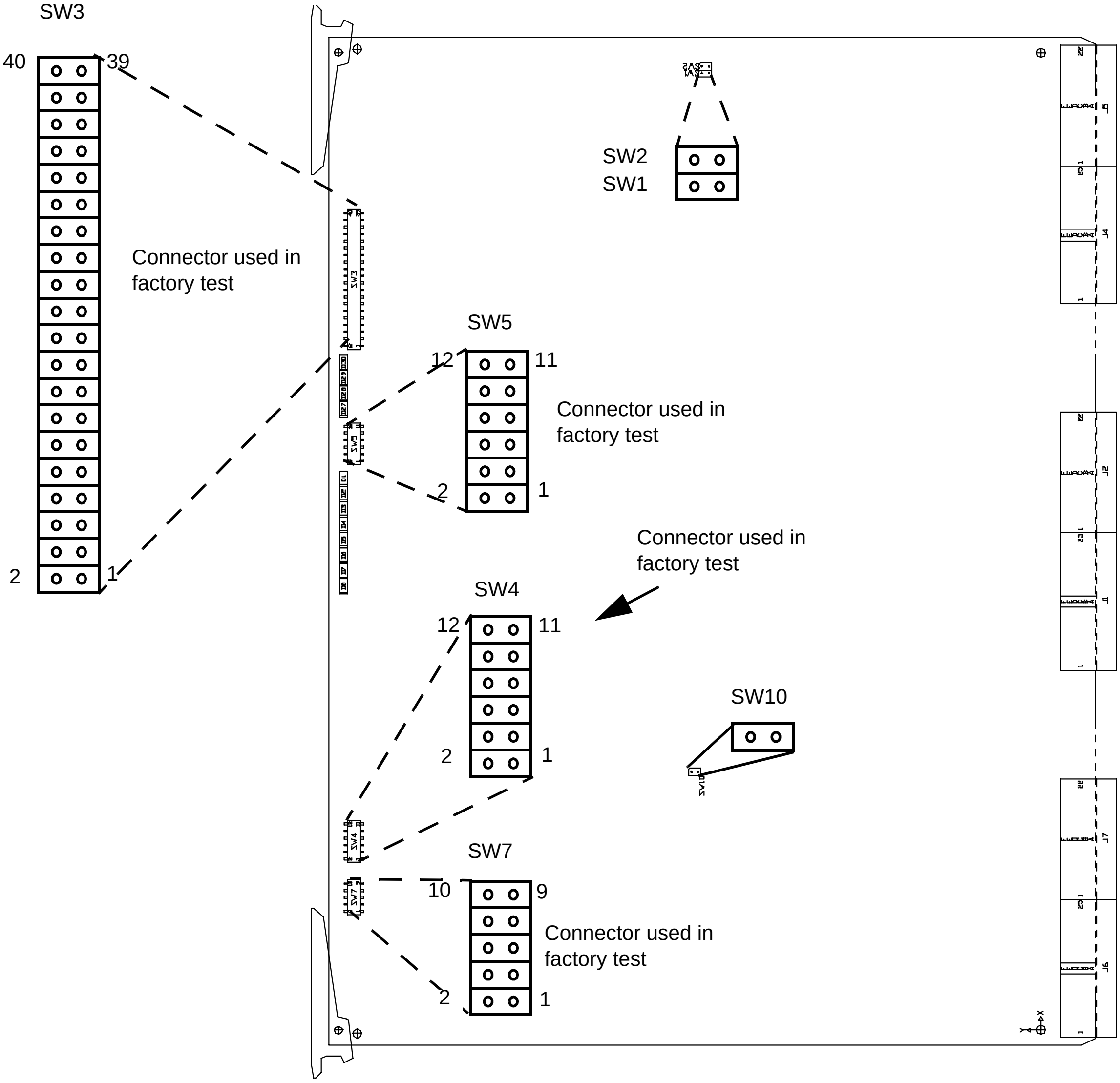

SW3
40
39
2
1
Connector used in factory test
SW2
SW1
SW5
12
11
Connector used in factory test
2
1
Connector used in factory test
SW4
12
11
2
1
SW10
SW7
10
9
Connector used in factory test
2
1

Figure 5-30 FEC-2, Jumpers and Connectors

5-3-17 Digital Signal Processors Subsystem In Units with FEP1

NOTE: The Digital Signal Processors Subsystem, as described here, is only used in Front-End Rack version 1 (FEP1).
In units with Front-End Rack version 2 (FEP2), the RFI board plus software on the BEP replaces the functionality of these boards, see: 5-3-21 "Radio Frequency Interface Board, RFI" on page 5-61.

5-3-17-1 General Description

The digitized signals from the Beam Formers, are connected to the Digital Signal Processing modules. These Digital Signal Processors together with software on the BEP, performs the adequate signal conditioning for the different data types; Tissue, Doppler and Color Flow.

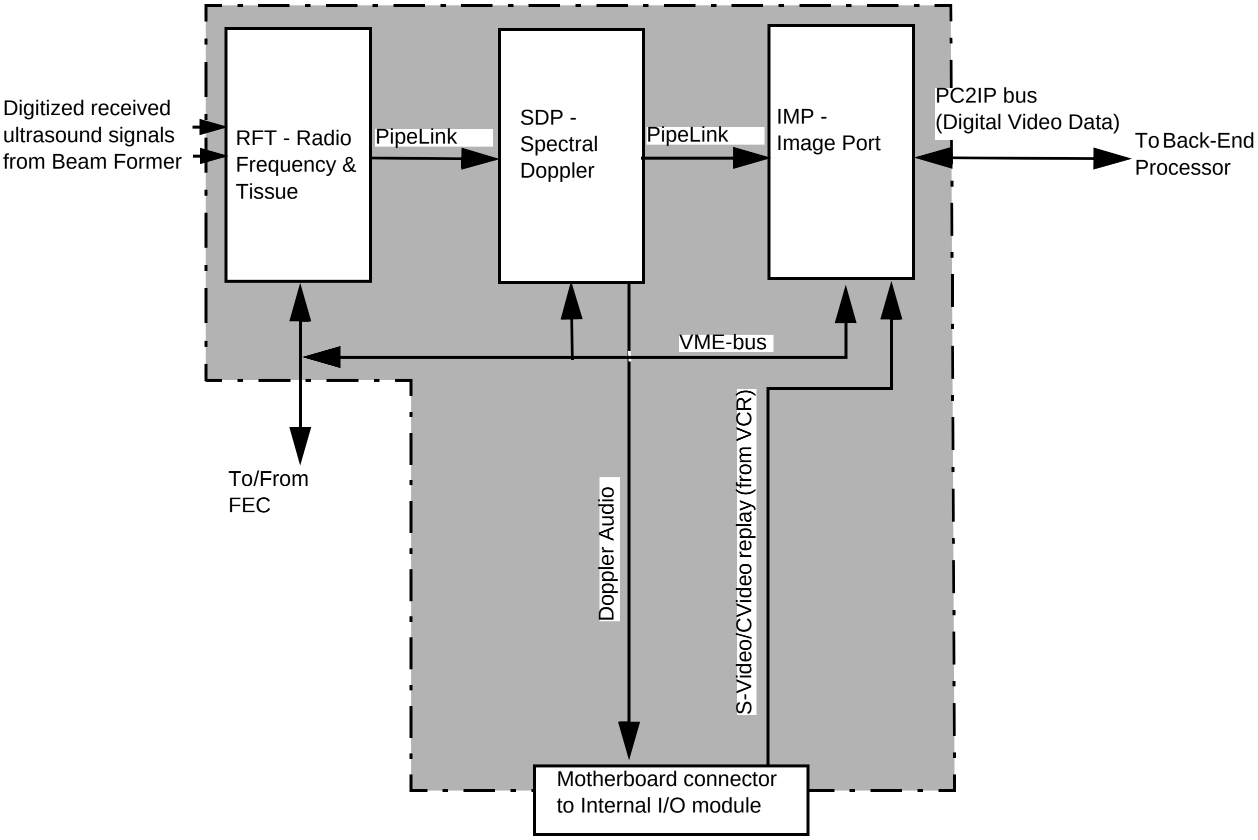

Digitized received ultrasound signals from Beam Former
RFT - Radio Frequency & Tissue
PipeLink
SDP - Spectral Doppler
PipeLink
IMP - Image Port
PC2IP bus (Digital Video Data)
To Back-End Processor
VME-bus
To/From FEC
Doppler Audio
S-Video/CVideo replay (from VCR)
Motherboard connector to Internal I/O module

Figure 5-31 Digital Signal Processing

5-3-17-1-1 Tissue and Doppler Signal Processing

A.) On units with FEP1, the following boards perform the signal processing for Tissue and Doppler signals,
- RF & Tissue Processor board (RFT)
- Spectrum Doppler Processor board (SDP).

B.) On units with FEP2, a new card, the Radio Frequency Interface (RFI) board (together with software on the BEP), replaces the functionality of the RFT and SDP cards and perform the signal processing for Tissue and Doppler signals.

5-3-17-1-2 Color Flow Processing

Color Flow processing is done by software on the Back-End Processor.

5-3-17-2 Location in the Unit

- Color Flow Processing is done by software on the Back-End Processor.
- Tissue processing and Doppler processing are done by the cards listed in Table 5-35 on page 5-46.

Table 5-35 Digital Signal Processor boards located in the Front-End Rack

SHORT NAME	MODULE NAME	COMMENTS
RFT	RADIO FREQUENCY & TISSUE PROCESSOR	FEP1
SDP	SPECTRUM DOPPLER PROCESSOR	FEP1
IMP	IMAGE PORT	FEP1
RFI	RADIO FREQUENCY INTERFACE	FEP2

5-3-17-3 Input Signals

- Digitized ultrasound signals from the Beam Formers
- S-Video/C-Video replay from VCR (via Internal I/O)

5-3-17-4 Bi-directional Signals

5-3-17-4-1 PC2IP Bus

Digital Control Signals and Parameters between Image Port and BEP, via PC2IP bus

5-3-17-4-2 VME Bus

The VME data bus is used for data communication between the following cards: FEC, RFT, SDP and IMP.

5-3-17-4-3 PipeLink Bus

The PipeLink bus is an unidirectional data bus, transporting data from the PipeLink dispatcher (RF & Tissue Processor) through the accessed processor(s) to the destination, the Image Port.

Data leaving the RF & Tissue Processor has a tag indicating what type of data that is transported; e.g. 2D Tissue, Doppler or 2D Flow. The receiver for the data will decode this tag and if it matches the processor’s own address, the data will be processed.

Data that doesn’t have a matching tag, is passed on to the next processor.

The Image Port will then map the data into the on-board Image Memory.

5-3-17-5 Output Signals

- Color Flow Data, from RFT via Image Port to BEP
- Digital video data via PC2IP bus, from Image Port to BEP
- Doppler audio sound, from SDP to Internal I/O

5-3-17-6 Power Distribution

Via Backplane, see description for each card.

5-3-17-7 Fuses, Jumpers, Dip-switches and LEDs

See description for each card.

5-3-18 RF & Tissue Processor Board, RFT

NOTE: *The RF & Tissue Processor Board (RFT) is only used in Front-End Rack version 1. In units with Front-End Rack version 2, the RFI board replaces the functionality of this board, see: 5-3-21 "Radio Frequency Interface Board, RFI" on page 5-61.*

5-3-18-1 General Description

The RF & Tissue Processor board receives digitized ultrasound signals from the Beam Formers. It extracts Tissue Data, Spectrum Data and IQ & Color Data from the digital data stream on its input and it also performs RF filtering and different types of Tissue Processing.

The result is sent via the PipeLink bus to the Spectrum Doppler Processor.

Both type of data and what data samples (RF_MODE) to use are communicated to the RFT board from the Front-End Controller board (over the Front-End Bus).

5-3-18-1-1 RF Processing

Different types of RF processing can be performed depending on later usage of the data; e.g.:

- RF Demodulation
- Digital Time Gain Compensation
- Filtering
- Decimation (data that are not needed for the processing, is removed)

5-3-18-1-2 Data Buffer

After RF filtering, the data is written into different sliding ring buffers, dedicated the different types of data. While data is written into the buffers sample by sample in vectors, multiple samples from the same range (depth) can be read out.

Both input addressing (start and length) and output addressing (through output events) are controlled by the Front-End Controller board.

5-3-18-1-3 Tissue Processing

A number of different tissue processes are performed on this board:

1.) First the signal amplitude is obtained by *detection*.
2.) Then the data is compressed to attenuate the strong signals and amplify the low level echoes.
3.) After compression, *Zone Stitching* is performed. Zone Stitching is used to combine the (transmit) focal zones from different vectors into one vector by weighting the zone transitions, and does only apply to phased/linear array probes where multiple vectors can be collected in the same direction. For M-Mode, *peak detection* and *edge enhancement* is implemented.
4.) Finally an offset can be added to the signal and clipping is performed.
5.) The tissue data is then tagged, and sent on to the Image Port board.

5-3-18-1-4 Color Flow Processing

No Color Flow processing is performed here, except for the RF demodulation previously mentioned. The data used for Color Flow is tagged with the appropriate headers and tails and routed through an output multiplexer, via the Image Port to the Back-End Processor (BEP).

In addition to RF demodulation, a variable digital high pass filter is implemented on the RFT board.The purpose of this filter is to remove strong low frequency signals returning from wall motion, valves and leaflets. The filtering is performed by an on-board DSP (Digital Signal Processor). Data is then tagged and sent to the Spectrum Doppler Processor board.

5-3-18 RF & Tissue Processor Board, RFT (cont'd)

5-3-18-1-5 Control

The RFT board has a local Digital Signal Processor (DSP) with an external EPROM.

The DSP performs multiple control tasks:

1.) It handles communication with the BEP over the VME bus.
2.) It updates filter coefficients and other parameters in the data path.
3.) When output events from the Front-End Controller is received, it sets up the PipeLink output control for data tagging and transfer.

During transfer of time motion data, it sets up a *time-slot* data transfer (which replaced the output event based transfer).

5-3-18-2 Location in the Unit

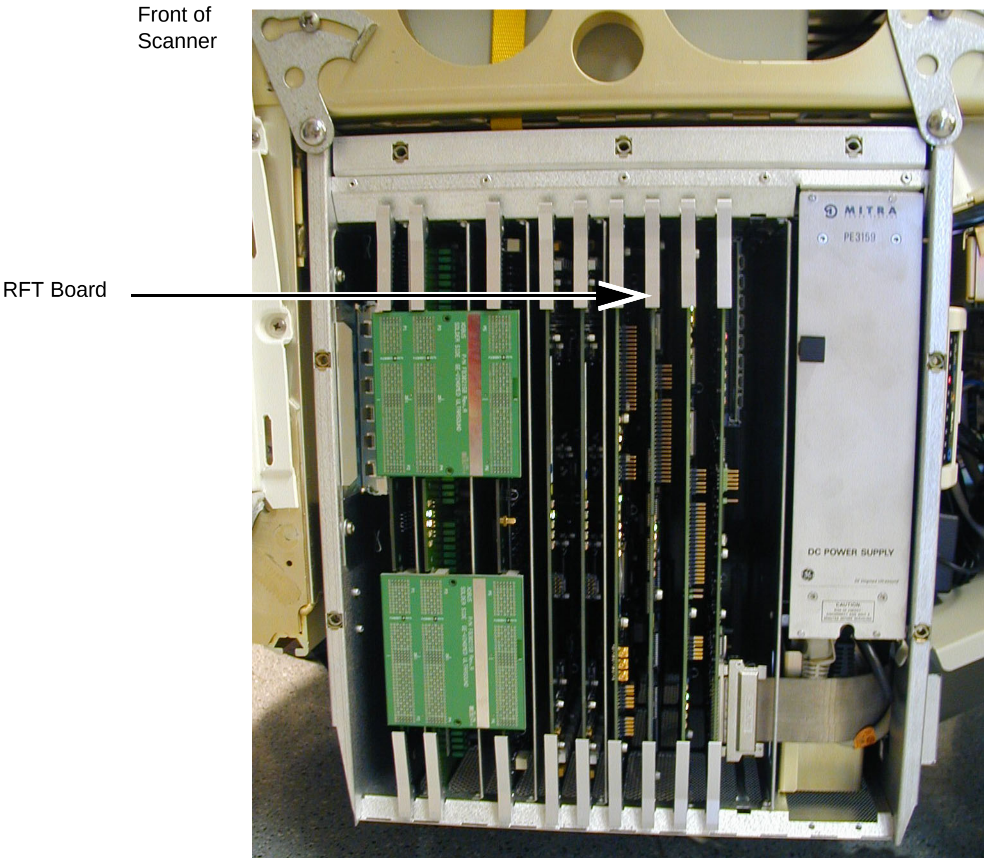


Figure 5-32 RFT Board: Location in Unit

5-3-18 RF & Tissue Processor Board, RFT (cont'd)

5-3-18-3 Inputs

5-3-18-3-1 Input Signals

Table 5-36 Input Signals

INPUT	DESCRIPTION	CONNECTION FROM
MLA 0 & MLA 1	Input data stream	
VME Bus	Data communication	BEP
Front-End Bus	Information about the type of data and the data sample.	FEC

5-3-18-4 Bi-directional Signals

Table 5-37 Bi-directional Signals

OUTPUT	DESCRIPTION	CONNECTION TO
VME Bus	Data communication	BEP (via P1)

5-3-18-5 Outputs

Table 5-38 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
Clock distribution	Clock distribution	
PipeLink	Digital Data Transfer	SDP IMP (via SDP) BEP (via SDP and IMP)
P4	Production Test Plug	
P5	Production Test Plug	

5-3-18-6 DC Voltages

Table 5-39 DC Voltages

INPUT	DESCRIPTION	CONNECTION FROM
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The "d" indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-18 RF & Tissue Processor Board, RFT (cont'd)

5-3-18-7 Fuses and Dip-switches

None

5-3-18-8 LEDs and Jumpers

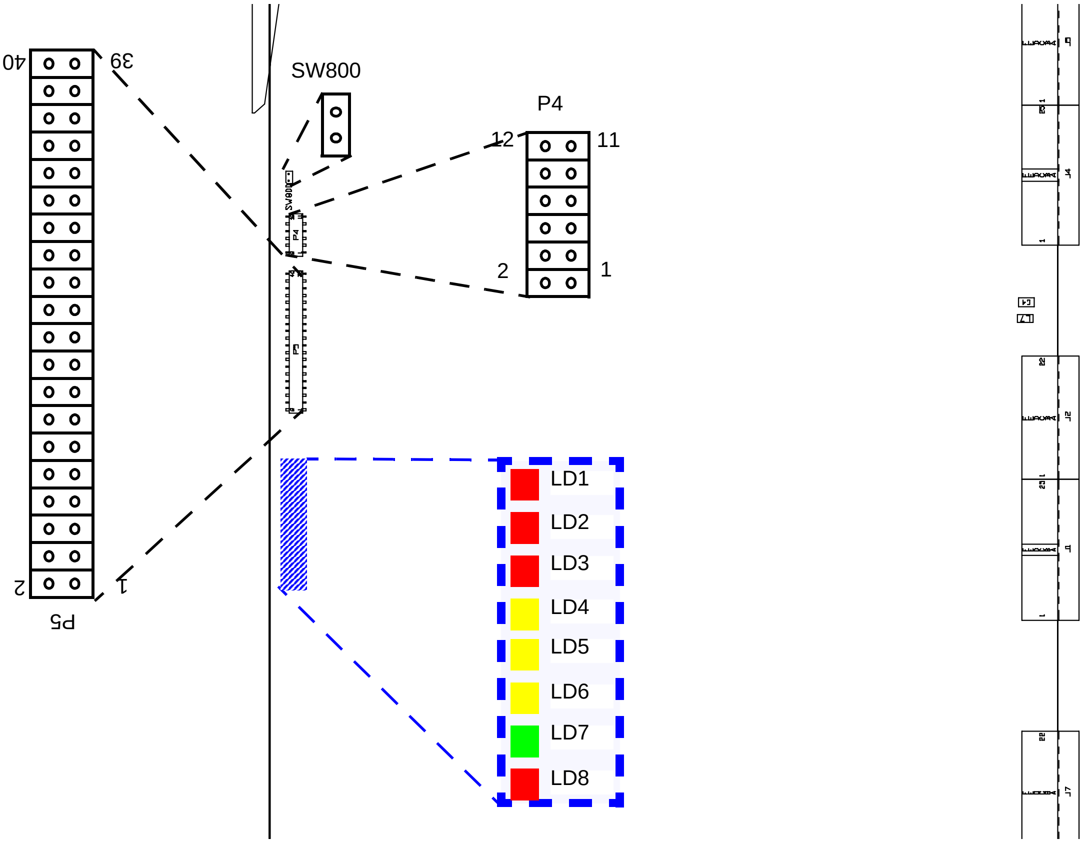


Figure 5-33 RFT, LEDs and Jumpers

Table 5-40 LEDs on the RFT Board

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD8	🟥 - Red	Board Failure	OFF
LD7	🟩 - Green	Board OK	ON
LD6	🟨 - Yellow	DSP Runs	BLINKING
LD5	🟨 - Yellow	Data Out on PipeLink	ON During Data Transfers to PipeLink
LD4	🟨 - Yellow	Spare	OFF
LD3	🟥 - Red	Clock Problems	OFF
LD2	🟥 - Red	Clock Problems	OFF
LD1	🟥 - Red	Clock Problems	OFF

5-3-19 Spectrum Doppler Processor Board, SDP

NOTE: *The Spectrum Doppler Processor Board is only used in Front-End Rack version 1.*
In units with Front-End Rack version 2, the RFI board plus software on the BEP replaces the functionality of this board, see: 5-3-21 "Radio Frequency Interface Board, RFI" on page 5-61.

5-3-19-1 General Description

- This board performs Spectrum Analysis on the Doppler signals and makes the velocity traces,
- The Doppler audio channels are generated on this board.
- During Duplex modes (e.g. 2D and Doppler), The Missing Signal Estimator will fill the gaps in the Doppler spectrum by stretching the “real” spectrum out to fill the missing time.
- A serial link from the Internal I/O board, feeds the A/D converted traces (like ECG, Phono and Pressure) into the SDP. These signals are sent together with the Doppler data via the PipeLink bus to the Image Port Board.

5-3-19-2 Doppler Processing

The Spectrum Doppler Processor board (SDP) receives digitized Doppler data from the RFT board, via the PipeLink bus. It performs the Pulsed Doppler processing and produces Doppler Audio.

- The processed Doppler result is sent via the PipeLink bus to IMP.
- Doppler Audio is routed via the backplane to the Internal I/O.

In Pulsed Wave (PW) Doppler, several sets of data from the same range (depth), but originating from different transmit pulses, are transferred from a data buffer on RFT. In Continuous Wave (CW) Doppler, the data samples are transferred consecutively.

5-3-19-3 Spectrum Analysis

The data sets are written into a sliding ring buffer with different ranges along the vertical axis and different transmit pulses along the horizontal (time) axis, thus achieving a two-dimensional matrix. By reading the data out of the buffer in a certain way (re. Principles of Operation) and performing Discrete Fourier Transform on the data, velocities up to seven times the pulse repetition frequency (in PW) can be displayed. Parts of the spectral analysis is done by a digital signal processor (DSP1).

During Duplex modes (e.g. 2D and Doppler) the gaps in the spectrum (when doing 2D) is filled by stretching the “real” spectrum out to fill the missing time.

5-3-19-4 Audio

The Doppler audio channels (I and Q, or DOPLA and DOPLB) are generated based upon the digital data stored in the ring buffer. The data is transferred from the buffer into DSP2 (Digital Signal Processor no. 2) which controls the D/A conversion as well as the Missing Signal Estimation of audio in Duplex modes.

5-3-19-5 Trace Interface

A serial link from the Internal I/O board, feeds several A/D converted traces (like ECG, phono, pressure) into the Spectrum Doppler Processor board.

These traces as well as spectral data, are tagged and transported over the PipeLink to the Image Port under control of DSP1.

5-3-19-6 Control

The DSP1 controls the data flow and updating of all parameters, including control of read/write address generation. It communicates with the BEP over the VME bus and provides the PipeLink output with spectrum and trace data.

5-3-19 Spectrum Doppler Processor Board, SDP (cont'd)

5-3-19-7 Location in the Unit

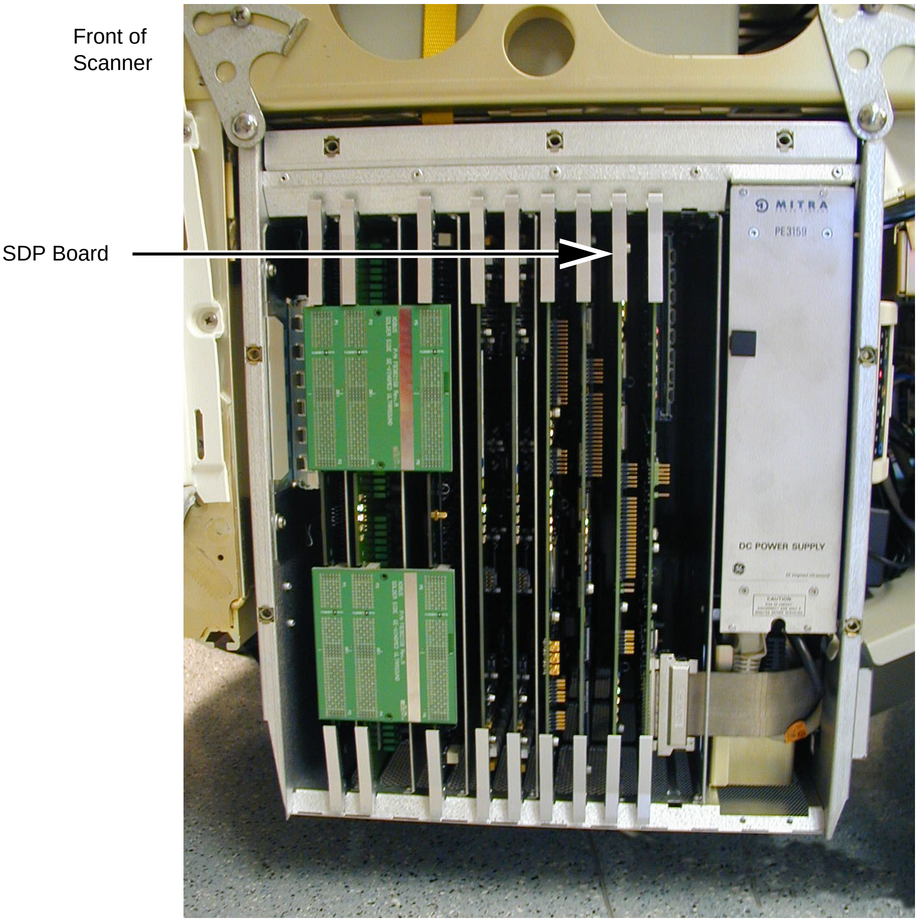


Figure 5-34 SPD Board - Location in Unit

5-3-19-8 Input Signals

Table 5-41 Input signals

INPUT	DESCRIPTION	CONNECTION FROM:
PipeLink	Doppler Signals extracted	RFT Board
Serial Trace Data	Analog Traces	Patient I/O via Internal I/O

5-3-19-9 Bi-directional Signals

Table 5-42 Bi-directional signals

INPUT	DESCRIPTION	CONNECTION FROM:
VME Bus	Data communication	BEP

5-3-19 Spectrum Doppler Processor Board, SDP (cont'd)

5-3-19-10 Outputs

Table 5-43 Output Signals

INPUT	DESCRIPTION	CONNECTION TO:
PipeLink	Doppler Signals extracted	IMP Board
Audio Output	Analog Doppler (I and Q) signals to Operator Panel speakers and VCR	Internal I/O
VME Bus	Data communication	IMP

5-3-19-11 DC Voltages

Table 5-44 DC Input Voltages

INPUT	DESCRIPTION	CONNECTION FROM:
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The "d" indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The "a" indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-19-12 Fuses and Dip-switches

None

5-3-19 Spectrum Doppler Processor Board, SDP (cont'd)

5-3-19-13 LEDs and Jumpers

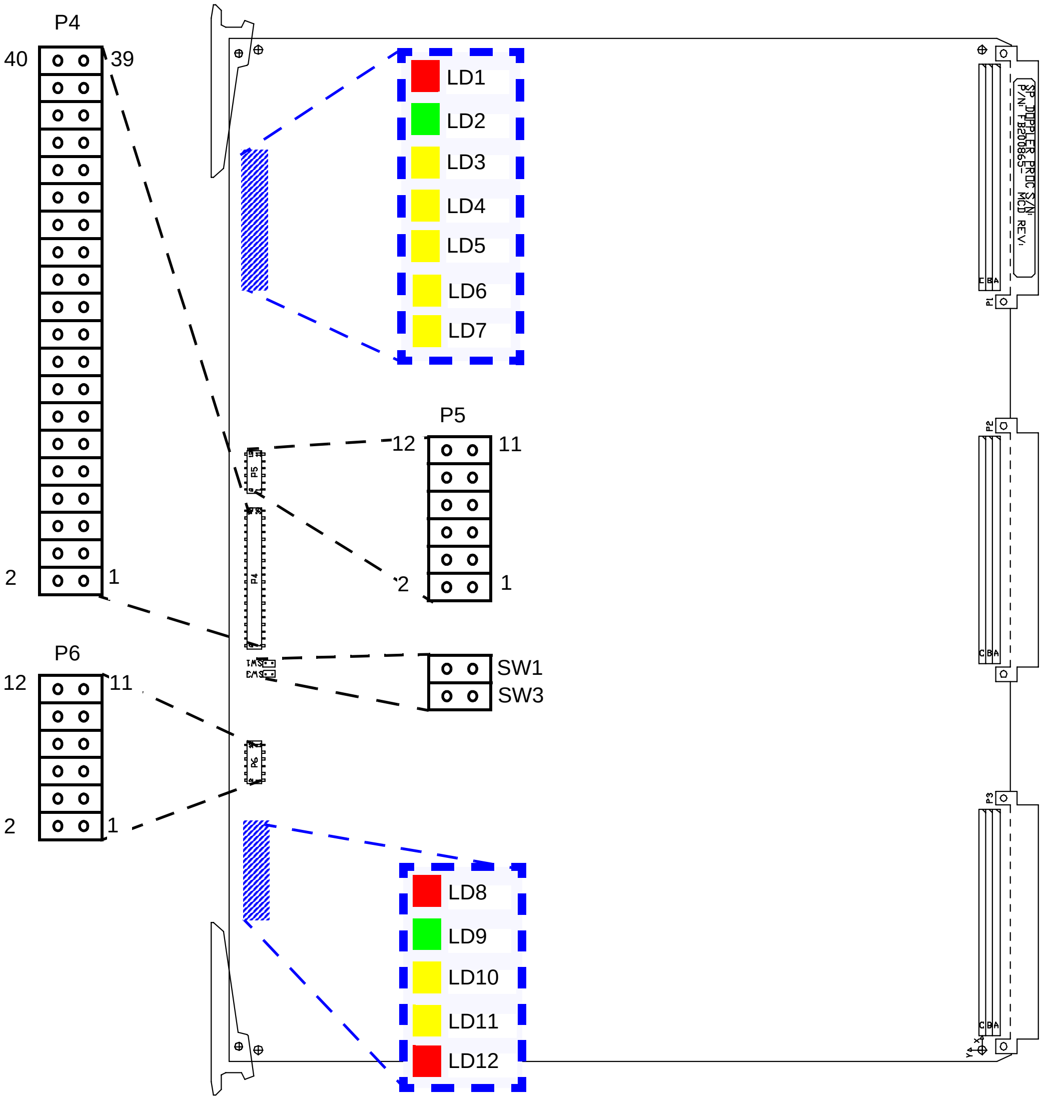

P4
40
39
2
1
LD1
LD2
LD3
LD4
LD5
LD6
LD7
P5
12
11
2
1
SW1
SW3
P6
12
11
2
1
LD8
LD9
LD10
LD11
LD12
SP DOPPLER PROC S/N
P/N FB200865- MCD REV.

Figure 5-35 SDP, LEDs and Jumpers

5-3-19 Spectrum Doppler Processor Board, SDP (cont'd)

Table 5-45 LEDs on the SDP Board

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
Upper Batch of LEDs			
LD1	🟥 - Red	DSP1 Status	OFF. ON if errors/warnings detected.
LD2	🟩 - Green	Board OK	ON OFF if error detected.
LD3	🟨 - Yellow 0	DSP1 Local SW Running	FLASHING
LD4	🟨 - Yellow 1	DSP1 Ready for Data	ON when scanning, else OFF
LD5	🟨 - Yellow 2	DSP1 has received data	ON in Doppler mode, else OFF
LD6	🟨 - Yellow 3	Data Out on PipeLink	ON during data transfer to PipeLink FIFO
LD7	🟨 - Yellow 4	Audio Path OK	ON in Doppler Mode and audio present.
Lower Batch of LEDs			
LD8	🟥 - Red	Board Failure	Normally OFF ON if errors detected
LD9	🟩 - Green	Board OK	Normally ON OFF if errors detected
LD10	🟨 - Yellow	DSP2 Local Software Running	Flashing
LD11	🟨 - Yellow	Audio Path OK	ON in Doppler Mode and audio present.
LD12	🟥 - Red	PipeLink Clock Problem	OFF ON if SDP clock is out of phase with RFT clock. NOTE: If system is working and LED is ON: System OK.

5-3-20 Image Port (IMP) Board

NOTE: Image Port is called “IMPORT” in some documents.

NOTE: The Image Port Board is only used in FEP1.
In units with FEP2, the RFI board replaces the functionality of this board, see: 5-3-21 "Radio Frequency Interface Board, RFI" on page 5-61.

NOTE: The Image Port Board is available in two versions for Vivid 7.
- IMP2, Part Number FB200991, can be used in all units with FEP1.
- IMP3, Part Number FC200120, can only be used in units with FEP1 and BEP2 installed.

5-3-20-1 General Description

The purpose of the Image Port is to capture processed data live from the scanner, or video data from the VCR, and route this data to the appropriate locations.

The main functions of the Image Port board:

- Capture data from RFT and SDP or the VCR (in playback), store it into Image Port’s internal memory and then route the resulting data to the BEP via the PC2IP bus.
  - Data from the RFT Card and the SDP Card are transferred over the PipeLink in data packages called Frames, Packets and Tuplets, all depending on size of the package.
  - At the Image Port the Packet is collapsed. A Frame contains enough data to construct one frame (e.g. one 2D frame), while one Tuplet contains enough data to construct one vector (e.g. one Color vector). The size of the vectors will depend on data type.
  - The Image Port demultiplexes the different types of data, groups the same types and maps them into the proper ring buffers in the Image Memory located on the Image Port 2 card.
  - Video and S-VHS (both in PAL and NTSC format) from the VCR (or another video source) is first digitized and then fed through a video multi-standard decoder providing decoded luminance (black and white) and chroma (color) data.
- Pick Color Flow data from the PipeLink bus and send it to the BEP via the PC2IP bus for processing in software on the BEP.
- Main Communication between BEP and the cards in the Front-End Card Rack (via the PC2IP bus and the VME bus).

Up to eight of the data sets below can be stored live simultaneously in eight different ring buffers in Image Port’s internal Image Memory. Typical size of the Image Memory is 256 MBytes.

- 2D Tissue data
- Doppler data
- M-Mode Tissue data
- 2D Flow data
- M-Mode Color data
- Trace data
- Video Luminance data
- Video Chroma data
- Video (SVideo - PAL/NTSC, CVideo - PAL/NTSC)
- RF data

5-3-20 Image Port (IMP) Board (cont’d)

5-3-20-2 Location in the Unit

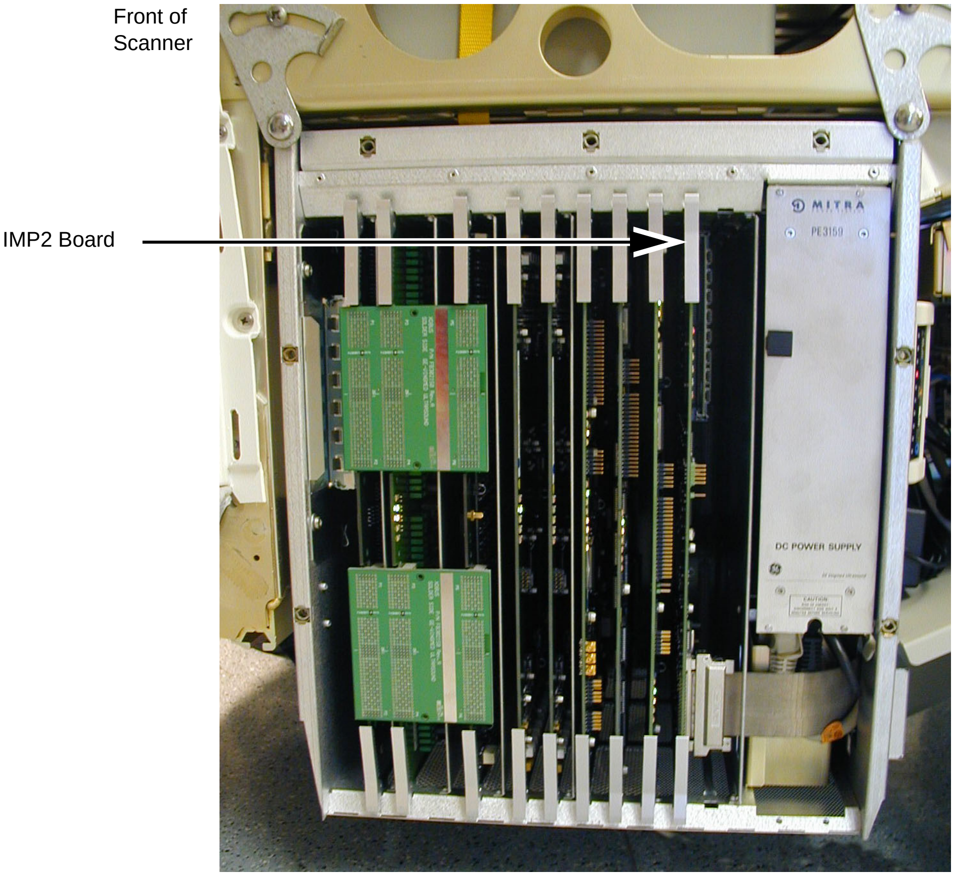

Front of Scanner
IMP2 Board
MITRA
PE3159
DC POWER SUPPLY

Figure 5-36 IMP Board - Location in Unit

5-3-20 Image Port (IMP) Board (cont'd)

5-3-20-3 Inputs

Table 5-46 Video and PipeLink Input Data

INPUT	DESCRIPTION	CONNECTION FROM:
PipeLink	Live scan data	SDP
Video	Composite Video or Super VHS Video. Supported Formats: SVHS - PAL SVHS - NTSC PAL NTSC	VCR via Internal I/O

5-3-20-4 Bi-directional Signals

Table 5-47 Bi-directional Signals

INPUT	DESCRIPTION	CONNECTION FROM:
PC2IP bus	Data and control parameters between Front-End Rack and BEP.	IMP to/from BEP
VME bus		FEC, RFT, SDP

5-3-20-5 Outputs

- Data to the Back-End Processor via PC2IP bus.
- Control signals and parameters via VME bus.

5-3-20-6 Power Distribution

Table 5-48 DC Input Voltages

INPUT	DESCRIPTION	CONNECTION FROM:
+ 5 Vd	DC voltage, distributed via Motherboard (Backplane). The “d” in “5Vd” indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” in “-5Va” indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

5-3-20-7 Fuses

None

5-3-20 Image Port (IMP) Board (cont'd)

5-3-20-8 Jumpers and Dip-switches

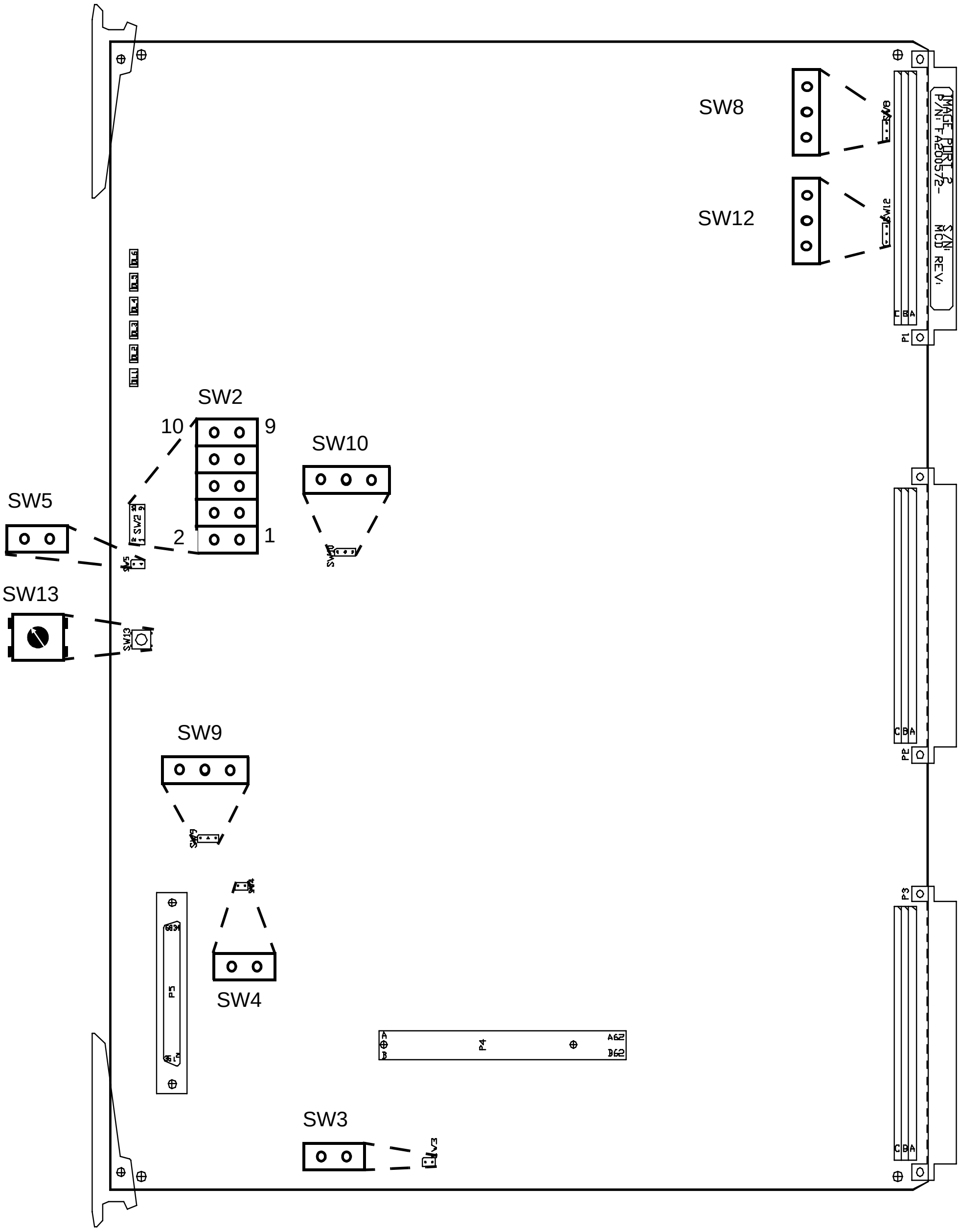

SW8
SW12
SW2
10
9
2
1
SW10
SW5
SW13
SW9
SW4
SW3

Figure 5-37 IMP, Jumpers and Switch

5-3-20 Image Port (IMP) Board (cont'd)

5-3-20-9 LEDs

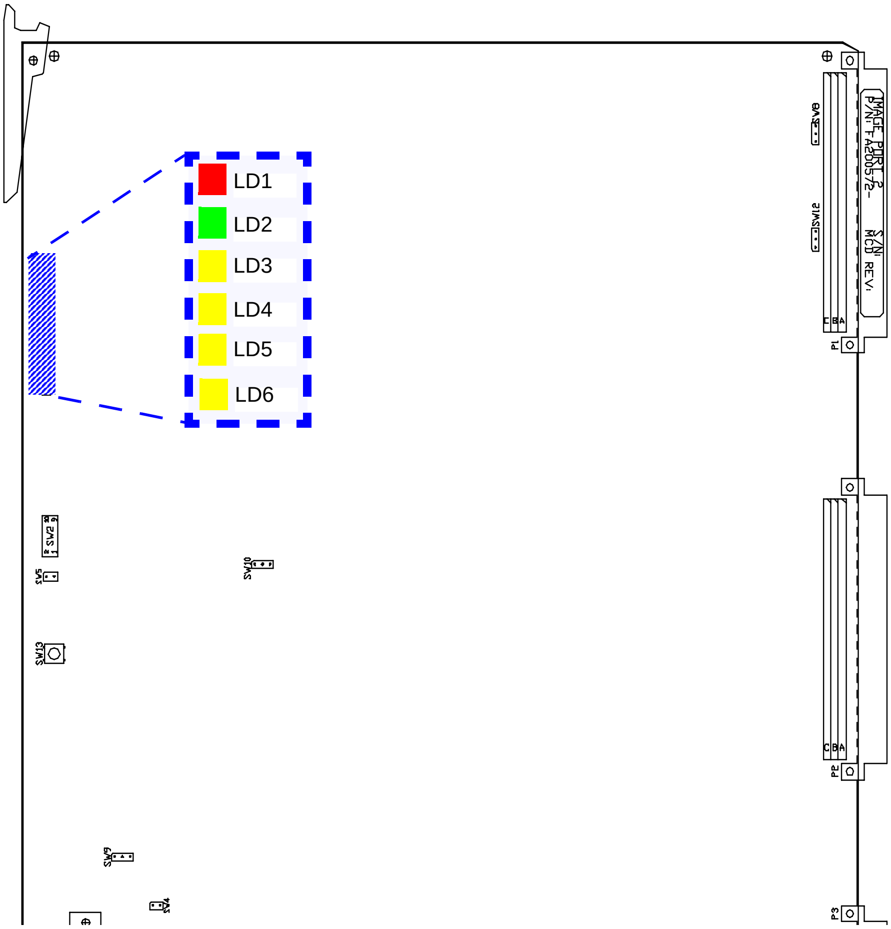

LD1
LD2
LD3
LD4
LD5
LD6
IMAGE PORT 2
P/N: FA200572-
S/N:
MCD REV:
SW8
SW12
C B A
P1
P2
P3
SW2
SW5
SW13
SW10

Figure 5-38 IMP2, LEDs

Table 5-49 IMP, LEDs

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD1	🟥 - Red	CPU self test failure or reset	Normally OFF (dimmed red light)
LD2	🟨 - Yellow	CPU addressing local bus	ON during scanning OFF in Freeze
LD3	🟨 - Yellow	Lit when firmware empties data FIFO to Image Memory	ON during scanning OFF in Freeze
LD4	🟨 - Yellow	Lit when IMP2 registers/FIFOs are accessed by the local CPU	Normally OFF
LD5	🟩 - Green	Board OK (used during manufacturing test).	Normally OFF
LD6	🟥 - Red	Board Failure (used during manufacturing test).	Normally OFF

All the LEDs should be OFF in Freeze (LD1 dimmed red light).

5-3-21 Radio Frequency Interface Board, RFI

5-3-21-1 General Description

The RFI board was introduced into the manufacturing in the 2nd half of 2003 together with the Front-End Processor version 2 (FEP2).

The functionality of the following boards are either implemented on the RFI board or on the BEP:

- Front-End Controller board
- RF & Tissue board
- Spectrum Doppler Processor board (some filtering done on RFI, the rest is done by BEP).
- Image Port board.

Tasks Done by the RFI board:

- System Master Clock generator
- Transmitter Control
- ATGC Control
- Receive Focusing Control
- Analog Test Signal Generator
- High Voltage Control and supervision
- Probe Sensing
- Control of Relay Board
- Doppler Audio D/A conversion
- Temperature Sensing for TEE probes
- Step Motor Control for TEE probes
- Temperature Sensing for circulated air

5-3-21-2 Signal Flow

The digitized signals from the Beam Formers, are connected to the RFI module. The Digital Signal Processor on the RFI board together with software on the BEP, performs the adequate signal conditioning for the different data types; Tissue, Doppler and Color Flow.

In addition, Doppler Audio Processing is done by the RFI board. The Doppler Spectrum Processing is done by the BEP.

The RFI extracts Tissue Data, Spectrum Data and IQ & Color Data from the digital data stream on its input and it also performs RF filtering and different types of Tissue Processing.

5-3-21-3 RF Processing

Different types of RF processing is performed depending on later usage of the data;

- RF Demodulation
- Digital Time Gain Compensation
- Filtering
- Decimation (data that are not needed for the processing, is removed)

5-3-21-4 Data Buffer

After RF filtering, the data is written into different sliding ring buffers, dedicated to the different types of data. While data is written into the buffers sample by sample in vectors, multiple samples from the same range (depth) can be read out.

Both input addressing (start and length) and output addressing (through output events) are controlled by the RFI board itself.

5-3-21-5 Tissue Processing

A number of different tissue processes are performed on this board:

1.) First the signal amplitude is obtained by *detection*.
2.) Then the data is compressed to attenuate the strong signals and amplify the low level echoes.
3.) After compression, *Zone Stitching* is performed. Zone Stitching is used to combine the (transmit) focal zones from different vectors into one vector by weighting the zone transitions, and does only apply to phased/linear array probes where multiple vectors can be collected in the same direction. For M-Mode, *peak detection* and *edge enhancement* is implemented.
4.) Finally an offset can be added to the signal and clipping is performed.

5-3-21-6 Color Flow Processing

No Color Flow processing is performed here, except for the RF demodulation previously mentioned. The data used for Color Flow is tagged with the appropriate headers and tails and sent to the Back-End Processor (BEP).

5-3-21-7 Doppler Data

Doppler Data is high pass filtered, to remove strong low frequencies returned from wall motion, valves and leaflets, on RFI and then sent to the BEP and to Audio Circuitry.

5-3-21-8 System Temperature Surveillance

The RFI board monitors the temperature in the airflow at the air intake and in the airflow at the air outlet.

- If the temperature inside the system (at the air outlet) increases to 60 ^{o}C, a “High System Temperature” error will be displayed on the screen.
- If the temperature increase to 65 ^{o}C, the system will start an automatic shutdown.

The temperature will normally be recorded at startup, and then repeated every hour. This frequency will increase if the temperature exceeds the limit.

The temperature measurements make it possible to monitor the environmental conditions (temperatures) for the scanner and prevent overheating.

The temperature measurements are available in a temperature log available via the Service Platform. It is also available at D:\log\logfile-temp.txt.

5-3-21-9 Probe Management

- Control the selection of a probe connector
- Sense the Probe type
- Sense the Scan Plane Angle on MPTE and PAMPTE probes
- Sense Probe Temperature
- Turn off the probe if temperature exceed maximum temperature.

  The temperature references are set to 41.3 °C and 43.0 °C.
- Turn off the probe if temperature reading falls below minimum temperature

  The minimum temperature references is set to15 °C. A temperature reading as low as 15 °C indicates a probe temperature sensing error.

5-3-21-10 TX Power Supply Management

The TX Power supply has two separate voltage outputs, TX Power Supply #1 (TX1) generates voltages for 2D imaging and TX Power Supply #2 (TX2) generates voltages for Doppler operation (CF, PW and CW).

The RFI set the voltage level for the two TX Power Supply outputs, TX1 and TX2.

The RFI also measure the voltage levels and current drain from the two TX outputs. It will turn off power to the probe if any of the values exceed the limit for a given mode.

5-3-21-11 Location in the Unit

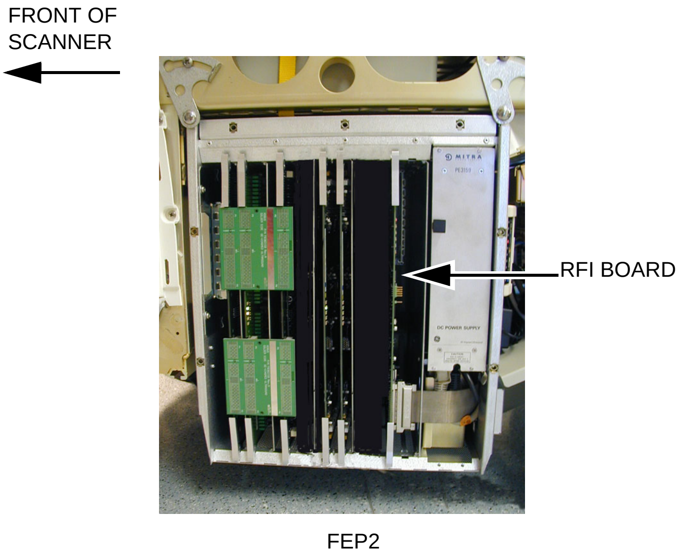


Figure 5-39 RFI board: Location in Unit

5-3-21-12 DC Voltages

Table 5-50 DC Input Voltages

INPUT	DESCRIPTION	CONNECTED TO
+ 3.3 Vd	DC output voltage, distributed via Motherboard (Backplane). The “d” indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The “d” indicates that this voltage is used for digital circuits.	DC Power Supply via Backplane
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
+ 15 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
- 15 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	DC Power Supply via Backplane
GND	Distributed via Motherboard (Backplane)	DC Power Supply via Backplane

Table 5-51 DC Voltages generated locally on RFI (regulated from +3.3 Vd)

VOLTAGE	DESCRIPTION	CONNECTED TO
+ 2.5 V	Generated from +3.3 Vd. On-board use only.	N/A
+ 1.5 V	Generated from +3.3 Vd. On-board use only.	N/A
+1.4 V	Generated from +3.3 Vd. On-board use only.	N/A
-2 V	Generated from -5 Va. ECL termination voltage.	Backplane

5-3-21-13 Input Signals

Table 5-52 Signal Inputs

INPUT	DESCRIPTION	CONNECTION FROM
PRPRES	Probe Present	Relay Board via Backplane
High Voltage V & I Sense	Senses the voltages and currents from the TX Supply	TX Power via Backplane
MLA data (2 buses)	Digitized received ultrasound signals from Beam Formers	Beam Formers via Backplane

5-3-21-14 Bi-directional Signals

Table 5-53 Bi-directional Signals

NAME	DESCRIPTION	CONNECTION TO/FROM
PC2IP	COMMUNICATION WITH BEP	PC2IP (BEP)
FEBUS	COMMUNICATION WITH THE OTHER BOARDS IN FEP	
I^{2}C BUSES	FOR TEMPERATURE AND PROBE ID	

5-3-21-15 Output Signals

Table 5-54 Output Signals

OUTPUT	DESCRIPTION	CONNECTION TO
TXTRIG_L	STARTS THE TRANSMITTER SEQUENCE	via Backplane to TX128 BOARDS
SYNC_L	SIGNAL USED TO SYNCHRONIZE THE BEAM FORMERS	via Backplane to BF64 BOARDS
TSIG	TEST SIGNAL	via Backplane to RX128 BOARD
ATGCVP/ATGCVN	DIFFERENTIAL SIGNALS USED TO CONTROL TGC ON THE RX BOARD	via Backplane to RX128 BOARD
BF CONTROL	CONTROL SIGNALS TO THE BEAM FORMERS	via Backplane to BF BOARDS
RLY CONTROL	CONTROL SIGNALS TO THE RELAY BOARD	via Backplane to RLY BOARD
TX Voltage Control	ONE SERIAL DATA LINE AND SEVERAL SELECT LINES TO THE TX SUPPLY	via Backplane to TX SUPPLY
Doppler Audio		via backplane to Internal I/O
Color Flow Data		Via PC2IP bus to BEP

5-3-21-16 Power Distribution

From DC Power via backplane to RFI.

5-3-21-17 Fuses

None.

5-3-21-18 Connectors

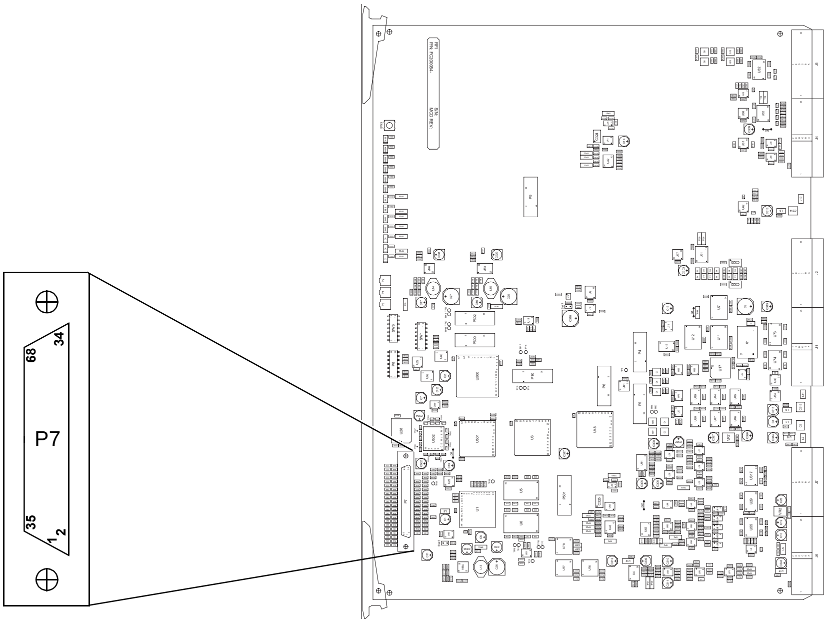


Figure 5-40 Connectors on the RFI Board

Table 5-55 RFI - Connectors

CONNECTOR #	DESCRIPTION	COMMENTS
P1	ATGC OUT	
P2	TXTRIG_L OUT	
P3	TEST TRIG OUT	
4	TEST	
5	TEST	
6	TEST	
P7	PCI CABLE CONNECTOR	CONNECTED TO PC2IP
P8	MANUFACTORING TEST	
9	N/A	N/A
10	TEST	
500	TEST	
501	TEST	
502	TEST	

5-3-21-19 Jumpers

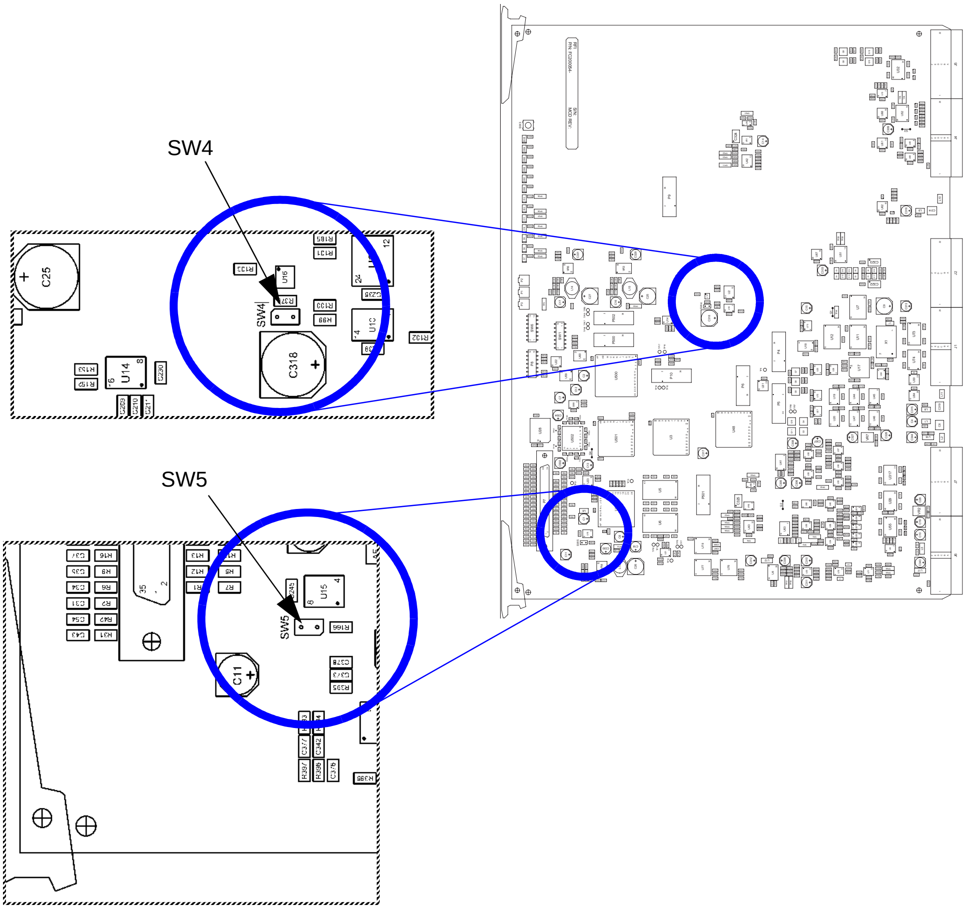


Figure 5-41 Jumpers on the RFI Board

Table 5-56 RFI - Jumpers

JUMPER NAME	DESCRIPTION	COMMENTS
SW4	WD ENABLE	BYPASSED, NOT USED.
SW5	DISABLE PCI EEPROM	

5-3-21-20 Dip-switches

None.

5-3-21-21 Switch on RFI

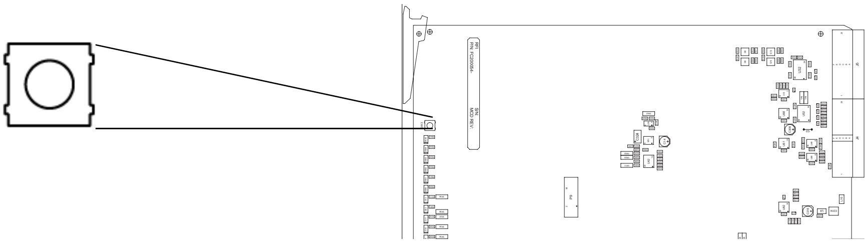


Figure 5-42 Reset Switch on the RFI Board

Table 5-57 RFI - Switches

NAME	DESCRIPTION	COMMENTS
SW3	RESET SWITCH	ONLY FOR USE BY ENGINEERING. (NOT INSTALLED ON ALL BOARDS)

5-3-21-22 Test Points

Table 5-58 RFI - Test Points

TEST POINT #	DESCRIPTION	COMMENTS
1	EMIFB CLOCK	133 MHz
2	Doppler Probe Sense Voltage	
3	Tempsense Output	130.8 mV/ ^{o}C
4	MAX158 INT	NOT USED
5	MAX158 RDY	NOT USED
6	-5 V	
7	CLK40	40 MHz
8	N/A	N/A
9	2.5 V voltage	Locally generated from +3.3 V
10	DSP CLOCK	50 MHz
11	15 V MONITOR voltage	
12	EMIFA CLOCK	133 MHz
13	DSP_BSOE3_L signal	
14	1.4 V voltage	Locally generated from +3.3 V
15	OPTIONAL EMIFB CLOCK	
16	N/A	
17	N/A	
18	N/A	
19	DSP CLOCK EMIFB OUT	
20	1.5 V voltage	Locally generated from +3.3 V
21	PCI P_LOCK_L signal	
22	-15 V voltage	
23	+15 V voltage	
24	+ 6 V voltage	
25	+3.3 V	
26	+10 V	
27	1.4 V voltage	
28	MAX158 INT	NOT USED
29	MAX158 RDY	NOT USED
30	Test Signal -V	Set Amplification
31	Test Signal +V	
32	1.5 V voltage	

Table 5-58 RFI - Test Points (cont'd)

TEST POINT #	DESCRIPTION	COMMENTS
33	2.5 V voltage	
34	3.3 V voltage	
35	5 V voltage	
36	- 5 V voltage	
37	N/A	
38	N/A	
39	-2.0 V voltage	
40	FAN VENT 1 voltage	
41	FAN VENT 2 voltage	
42	10V_Ref_voltage	
43	- 5V_ref voltage	
44	5V_ref voltage	
45	AUDIO RIGHT CHANNEL OUT	+/- 1 V
46	AUDIO LEFT CHANNEL OUT	+/- 1 V
47	N/A	
48	N/A	
49	N/A	
50	CLK20	20 MHz
500...507	GND	

5-3-21-23 LEDs on the RFI Board

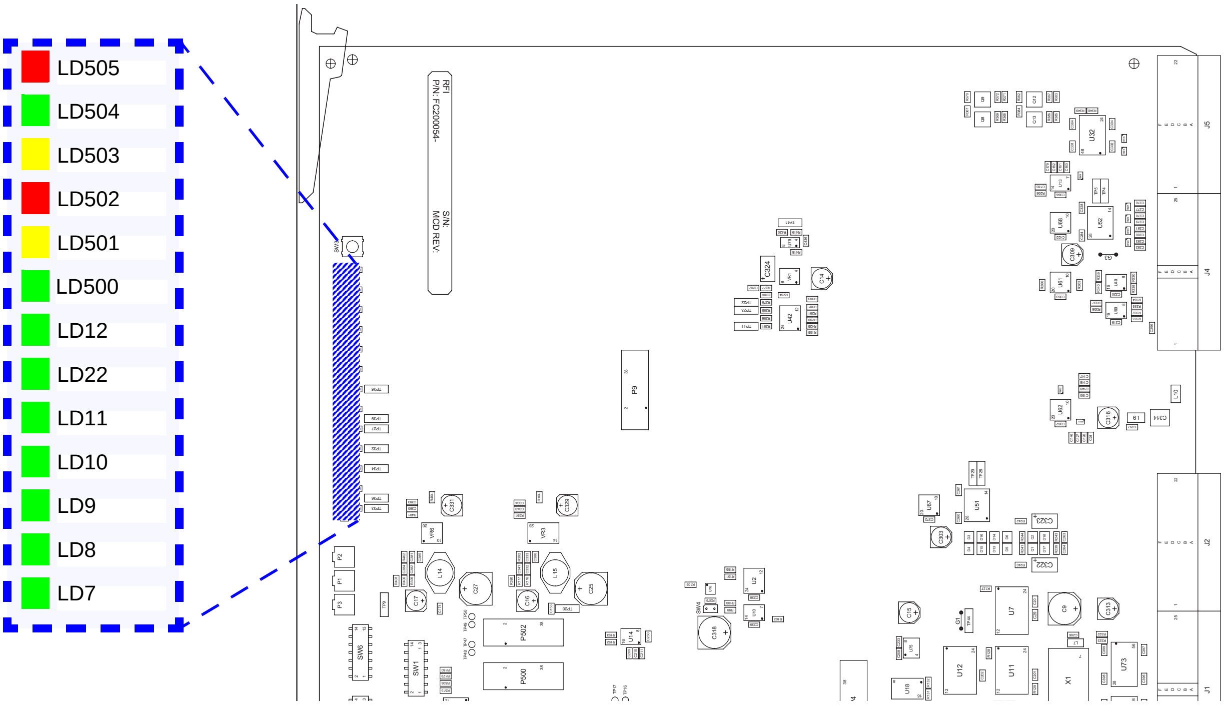

LD505
LD504
LD503
LD502
LD501
LD500
LD12
LD22
LD11
LD10
LD9
LD8
LD7
RFI
P/N: FC200054-
S/N:
MCO REV.
P9
P502
P500
SW6
SW1
J5
J4
J2
J1

Figure 5-43 LEDs on the RFI Board

Table 5-59 RFI - LEDs

LED #	LED COLOR	DESCRIPTION	NORMAL STATE
LD505	🟥 - Red	Demod Error	
LD504	🟩 - Green	Lit in scanning mode	Slow tick in idle
LD503	🟨 - Yellow	Transmit data to BEP	During Processing
LD502	🟥 - Red	Not Used	
LD501	🟨 - Yellow	Not Used	
LD500	🟩 - Green	Not Used	
LD12	🟩 - Green	5.0 V status	ON
LD22	🟩 - Green	-2.0 V status	ON
LD11	🟩 - Green	1.4 V status	ON
LD10	🟩 - Green	1.5 V status	ON
LD9	🟩 - Green	3.3 V status	ON
LD8	🟩 - Green	-5.0 V status	ON
LD7	🟩 - Green	2.5 V status	ON

5-3-22 Motherboard (Backplane)

5-3-22-1 General Description

The Motherboard is the Front End Card Rack's Backplane. It distributes DC Voltages from the DC Power to all the boards in the Card Rack and interconnects (distributes signals and data buses between) the different boards.

Two versions have been used:

- The first version is used for FEP1
- The second version is used for FEP2

5-3-22-2 Location in the Unit

Rear of Card Rack.

5-3-22-3 Inputs

See the different board's descriptions

5-3-22-4 Outputs

See the different board's descriptions

5-3-22-5 Fuses

None

5-3-22-6 Jumpers and Dip-switches

None

5-3-22-7 LEDs

None

Section 5-4
Back-End Processor (BEP)

5-4-1 BEP Overview

Contents in this section:

- 5-4-2 "Introduction" on page 5-74
- 5-4-3 "Signal Flow and Processing" on page 5-74
- 5-4-4 "Location of the Back-End Processor (BEP)" on page 5-75
- 5-4-5 "Back-End Processor (BEP) Block Diagrams" on page 5-76
- 5-4-6 "Back-End Processor (BEP) Descriptions" on page 5-88
- 5-4-7 "Internal Storage Devices" on page 5-95
- 5-4-8 "Back-End Processor (BEP) Inputs" on page 5-95
- 5-4-9 "Back-End Processor (BEP) Outputs" on page 5-97
- 5-4-10 "UPS Battery Description" on page 5-98

5-4-2 Introduction

The Back-End Processor is a computer designed specially for the use in the Vivid 7 ultrasound scanners made by GE.

The following BEP versions have been used for Vivid 7:

- BEP1 was introduced at the introduction of the Vivid 7 ultrasound scanners in 2001.
- BEP2 was introduced September 2002 as a replacement for BEP1, both for new ultrasound scanners from factory and for service replacement in the field.
  A special BEP4 version is available as replacement unit for BEP2.
- BEP2.2 was introduced 2nd half of 2003 and is used in units with RFI.
  A special BEP4 version is available as replacement unit for BEP2.2.
- BEP3 was introduced with software version v4.0, 2nd half of 2004. Supports the 3D/4D option.
- BEP3.2 and BEP4.2 supports Patient I/O with internal USB interface. Supports the 3D/4D option.
- BEP4.x supports Patient I/O both with USB1.1 and USB2.0 interface. MO drive is an option.
  The BEP4 is delivered in several different variants:
    - BEP4.3 without 4D for use in new systems (introduced with BT’08) (wo/4D).
    - BEP4.3 with 4D for use in new system (introduced with BT’08) (w/4D).
    - BEP4.2 without 4D for use in new systems and as a replacement for BEP3.x (wo/4D).
    - BEP4.2 with 4D for use in new systems and as a replacement for BEP3.x (w/4D).
    - BEP4 for use as a replacement for BEP2.2.
    - BEP4 for use as a replacement for BEP2.

NOTE: *When the descriptions in this section applies only to one or some of the BEPs, it will be marked in the text with BEP1, BEP2, BEP2.2, BEP3, BEP3.2, BEP4.2 or BEP4.3.*
An “x” as in “BEP3.x” indicates that both BEP3 and BEP3.2 are covered.

5-4-3 Signal Flow and Processing

The Back-End Processor receives the data from the Front-End electronics, stores it in memory, performs scan conversion to pixel domain, and drives the system RGB monitor.

Back-End Processor software is also processing the Color Flow, Doppler, M-Mode and 4D data.

- BEP4.2 without 3D/4D:
  See Figure 5-46 "CPU/Back-End Processor Block Diagram (BEP4.2 without 4D)" on page 5-77.
- BEP4.2 with 3D/4D:
  See Figure 5-47 "BEP4.2 with 4D (Replacement for BEP3.2 w/4D) - Block Diagram" on page 5-78.
- BEP3 without 3D/4D:
  See Figure 5-50 "CPU/Back-End Processor Block Diagram (BEP3.2 without 3D)" on page 5-81.
- BEP3.2 with 3D/4D:
  See Figure 5-51 "CPU/Back-End Processor Block Diagram (BEP3.2 with 3D)" on page 5-82.
- BEP3.2 without 3D/4D:
  See Figure 5-52 "CPU/Back-End Processor Block Diagram (BEP3 without 3D)" on page 5-83.
- BEP3 with 3D/4D:
  See Figure 5-53 "CPU/Back-End Processor Block Diagram (BEP3 with 3D)" on page 5-84.
- BEP2.2:
  See Figure 5-54 "CPU/Back-End Processor Block Diagram (BEP 2.2)" on page 5-85.
- BEP2:
  See Figure 5-55 "CPU/Back-End Processor Block Diagram (BEP 2)" on page 5-86.
- BEP1:
  Figure 5-56 "CPU/Back-End Processor Block Diagram (BEP1)" on page 5-87.

5-4-4 Location of the Back-End Processor (BEP)

The BEP is located on the left side, inside the scanner, see Figure 5-44 and Figure 5-45.

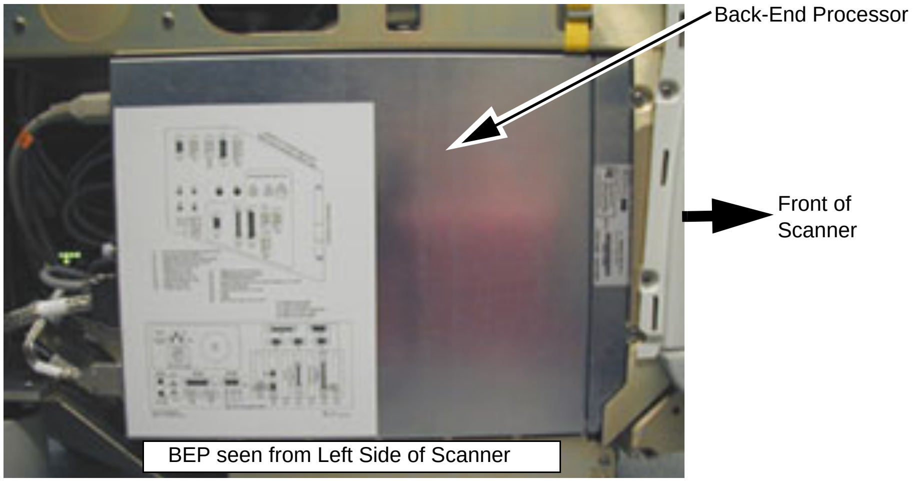

Back-End Processor
Front of Scanner
BEP seen from Left Side of Scanner

Figure 5-44 Back-End Processor Mounted in Scanner (BEP1 shown)

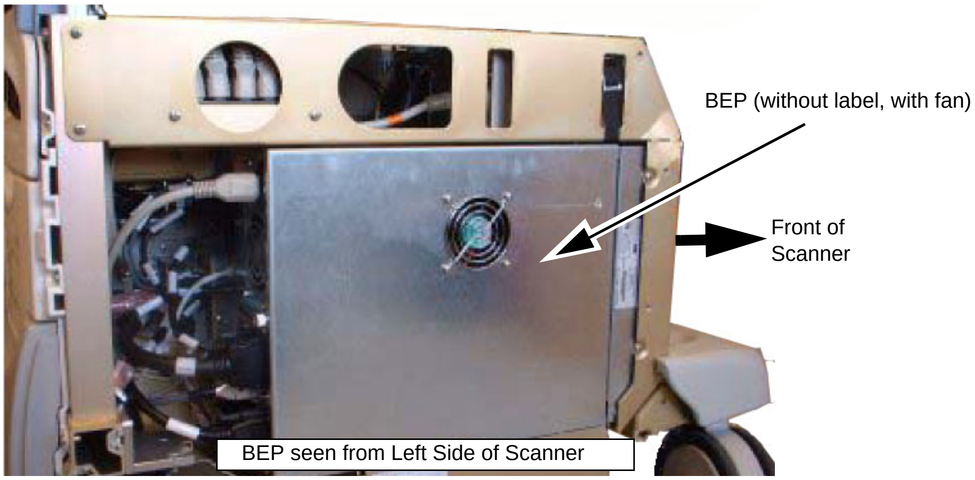

BEP (without label, with fan)
Front of Scanner
BEP seen from Left Side of Scanner

Figure 5-45 Back-End Processor Mounted in Scanner (BEP without label, with fan is shown)

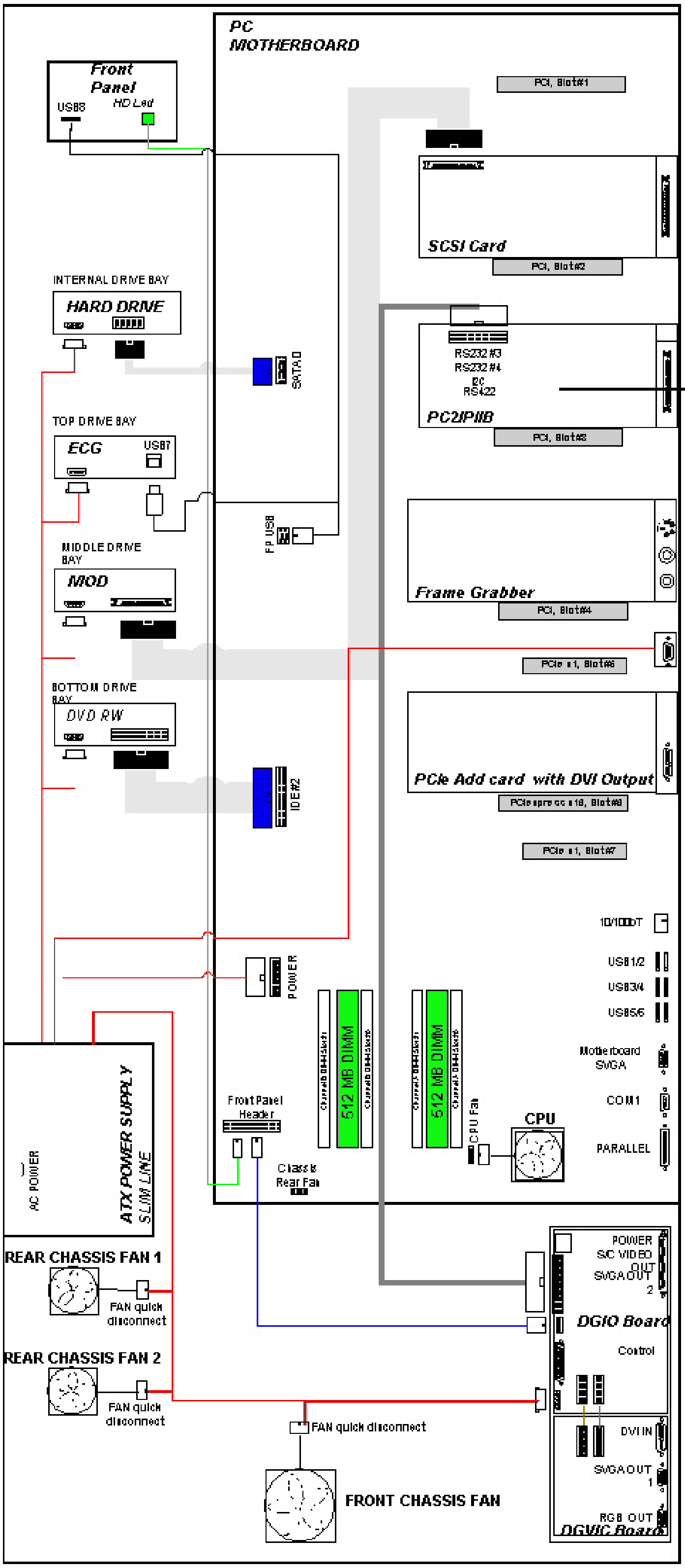
5-4-5 Back-End Processor (BEP) Block Diagrams

5-4-5-1 Overview

Contents in this sub-section:

- 5-4-5-2 "BEP4.2 wo/ 4D (Manufacturing & BEP3.2 Replacement) - Block Diagram" on page 5-77
- 5-4-5-3 "BEP4.2 with 4D (Manufacturing & BEP3.2 w/4D Replacement) - Block Diagram" on page 5-78
- 5-4-5-4 "BEP4 (Replacement for BEP2.2) - Block Diagram" on page 5-79
- 5-4-5-5 "BEP4 (Replacement for BEP2) - Block Diagram" on page 5-80
- 5-4-5-6 "BEP3.2 without 4D - Block Diagram" on page 5-81
- 5-4-5-7 "BEP3.2 with 4D - Block Diagram" on page 5-82
- 5-4-5-8 "BEP3 without 4D - Block Diagram" on page 5-83
- 5-4-5-9 "BEP3 with 4D - Block Diagram" on page 5-84
- 5-4-5-10 "BEP2.2 Block Diagram" on page 5-85
- 5-4-5-11 "BEP2 Block Diagram" on page 5-86
- 5-4-5-12 "BEP1 Block Diagram" on page 5-87

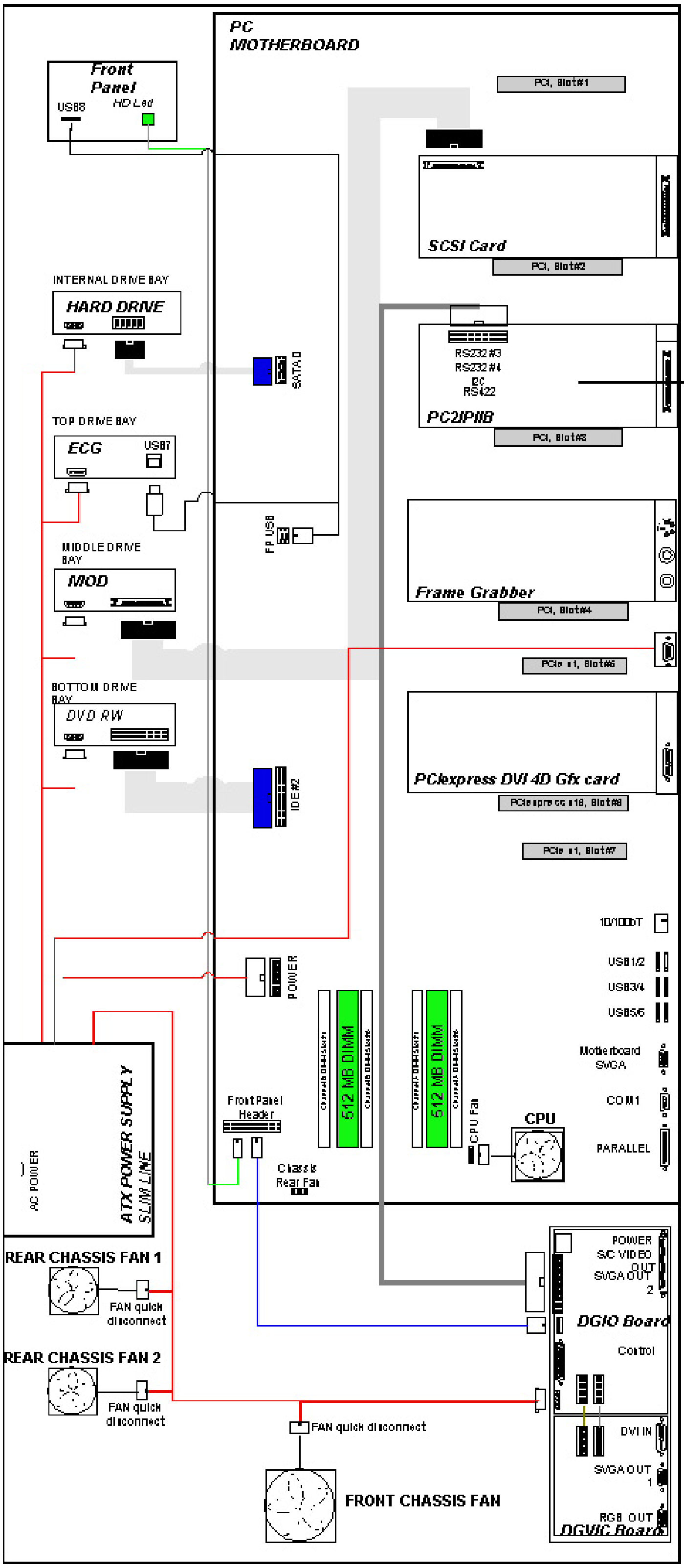
5-4-5-2 BEP4.2 wo/ 4D (Manufacturing & BEP3.2 Replacement) - Block Diagram


PC
MOTHERBOARD
Front
Panel
USB8
HD Led
PCI, Slot#1
SCSI Card
PCI, Slot#2
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI, Slot#3
TOP DRIVE BAY
ECG
USB7
FP USB
MIDDLE DRIVE
BAY
MOD
Frame Grabber
PCI, Slot#4
PCIe x1, Slot#6
BOTTOM DRIVE
BAY
DVD RW
PCIe Add card with DVI Output
PCIe x16, Slot#8
IDE #2
PCIe x1, Slot#7
10/100bT
USB1/2
USB3/4
USB5/6
POWER
512 MB DIMM
512 MB DIMM
Motherboard
SVGA
COM1
PARALLEL
CPU
CPU Fan
Front Panel
Header
Chassis
Rear Fan
AC POWER
ATX POWER SUPPLY
SLIM LINE
REAR CHASSIS FAN 1
FAN quick
disconnect
REAR CHASSIS FAN 2
FAN quick
disconnect
FAN quick disconnect
FRONT CHASSIS FAN
POWER
S/C VIDEO
OUT
SVGA OUT
2
DGIO Board
Control
DVI IN
SVGA OUT
1
RGB OUT
DGVIC Board

PC2IP3 HAS BEEN INTRODUCED IN MANUFACTORING.

Figure 5-46 CPU/Back-End Processor Block Diagram (BEP4.2 without 4D)

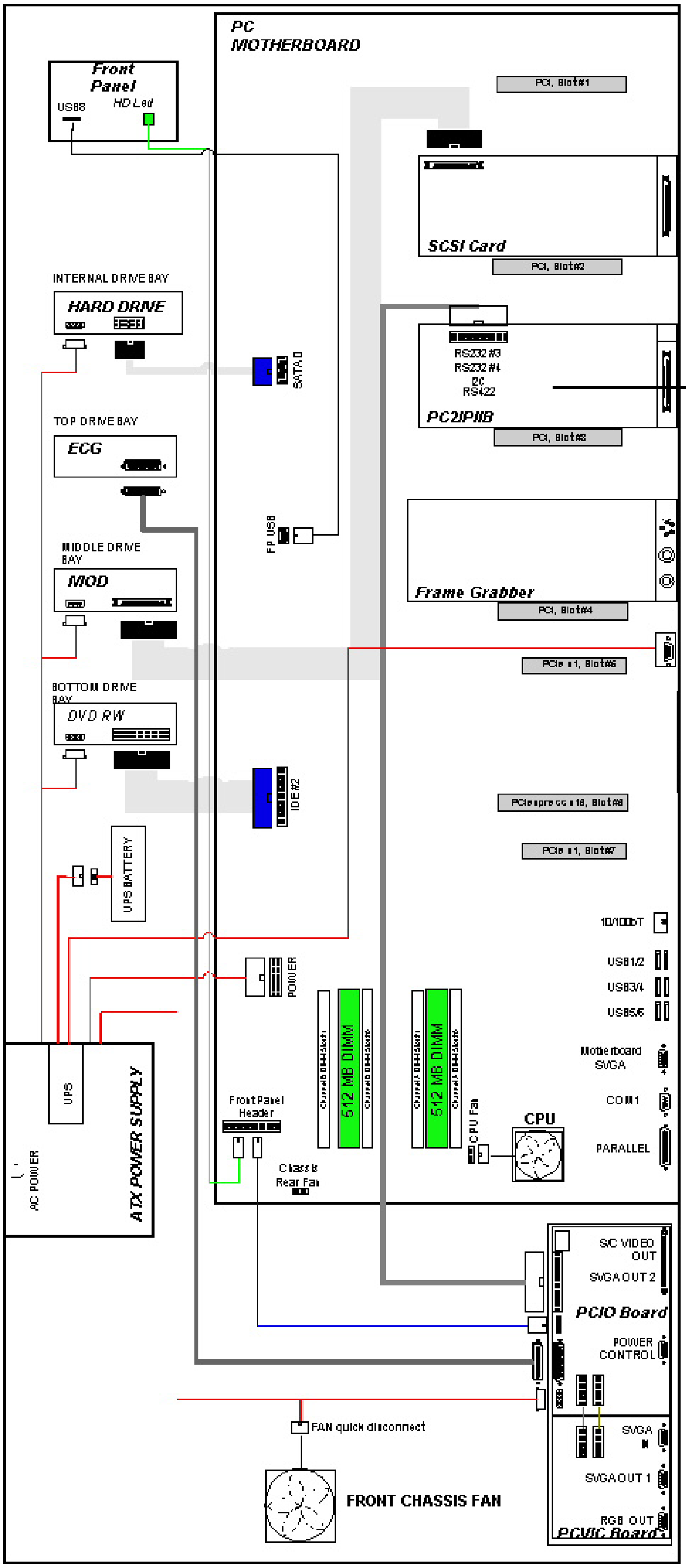
5-4-5-3 BEP4.2 with 4D (Manufacturing & BEP3.2 w/4D Replacement) - Block Diagram


PC MOTHERBOARD
Front Panel
USB8
HD Led
PCI, Slot#1
SCSI Card
PCI, Slot#2
INTERNAL DRIVE BAY
HARD DRIVE
SATA0
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI, Slot#3
TOP DRIVE BAY
ECG
USB7
FP USB
MIDDLE DRIVE BAY
MOD
Frame Grabber
PCI, Slot#4
PCIe x1, Slot#6
BOTTOM DRIVE BAY
DVD RW
PCIexpress DVI 4D Gfx card
PCIexpress x16, Slot#8
IDE #2
PCIe x1, Slot#7
10/100bT
USB1/2
USB3/4
USB5/6
POWER
Motherboard SVGA
COM1
PARALLEL
512 MB DIMM
512 MB DIMM
CPU
CPU Fan
Front Panel Header
Chassis Rear Fan
AC POWER
ATX POWER SUPPLY SLIM LINE
REAR CHASSIS FAN 1
FAN quick disconnect
REAR CHASSIS FAN 2
FAN quick disconnect
FAN quick disconnect
FRONT CHASSIS FAN
POWER
S/C VIDEO OUT
SVGA OUT 2
DGIO Board
Control
DVI IN
SVGA OUT 1
RGB OUT
DGVIC Board

PC2IP3 HAS BEEN INTRODUCED IN MANUFACTORING.

Figure 5-47 BEP4.2 with 4D (Replacement for BEP3.2 w/4D) - Block Diagram

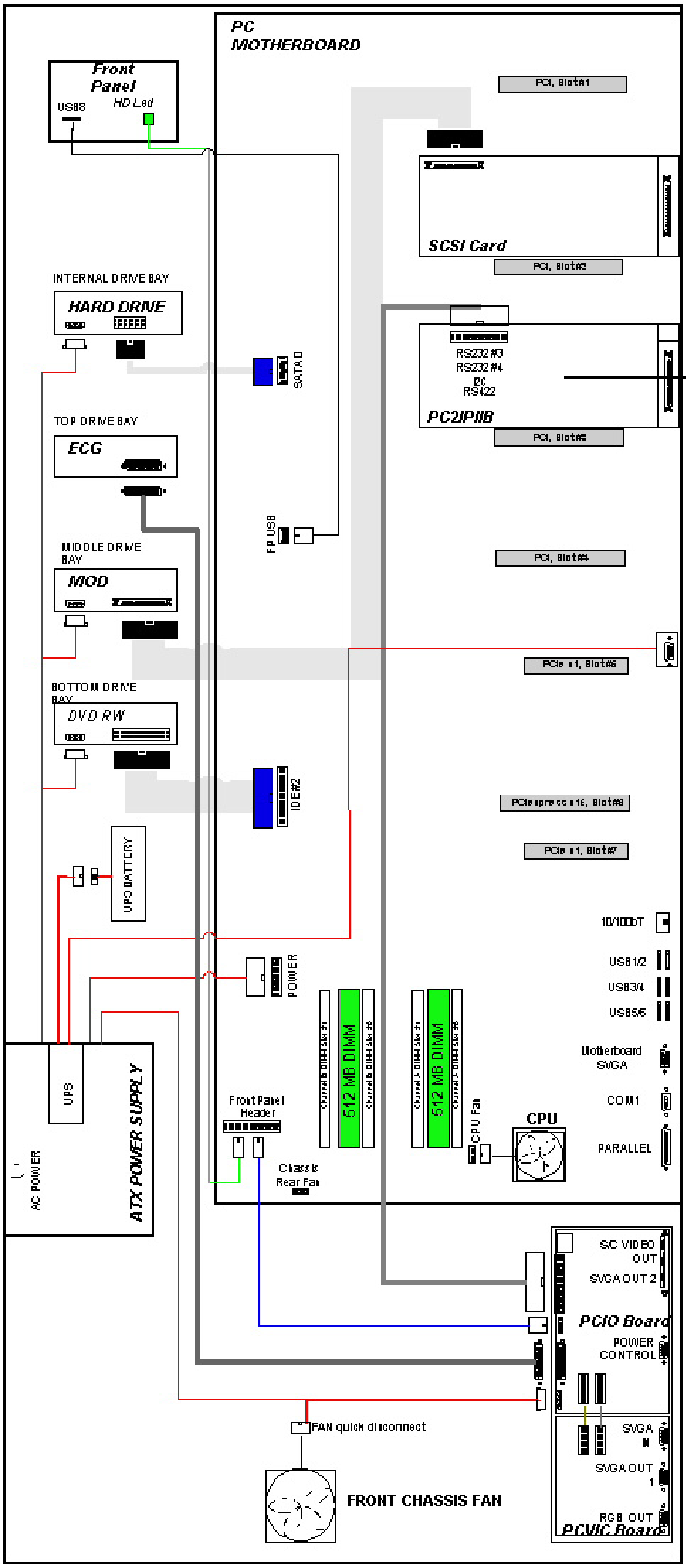
5-4-5-4 BEP4 (Replacement for BEP2.2) - Block Diagram


PC MOTHERBOARD
Front Panel
USB8
HD Led
PCI, Slot#1
SCSI Card
PCI, Slot#2
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI, Slot#3
TOP DRIVE BAY
ECG
FP USB
MIDDLE DRIVE BAY
MOD
Frame Grabber
PCI, Slot#4
PCIe x1, Slot#5
BOTTOM DRIVE BAY
DVD RW
IDE #2
PCIexpress x16, Slot#6
PCIe x1, Slot#7
UPS BATTERY
10/100bT
USB1/2
USB3/4
USB5/6
Motherboard SVGA
COM1
PARALLEL
POWER
512 MB DIMM
512 MB DIMM
CPU Fan
CPU
Front Panel Header
Chassis Rear Fan
UPS
AC POWER
ATX POWER SUPPLY
S/C VIDEO OUT
SVGA OUT 2
PCIO Board
POWER CONTROL
SVGA IN
SVGA OUT 1
RGB OUT
PCVIC Board
FAN quick disconnect
FRONT CHASSIS FAN

PC2IP3 HAS BEEN INTRODUCED IN MANUFACTORING.

Figure 5-48 BEP4 (Replacement for BEP2.2) - Block Diagram

5-4-5-5 BEP4 (Replacement for BEP2) - Block Diagram


PC MOTHERBOARD
Front Panel
USB8
HD Led
PCI, Slot#1
SCSI Card
PCI, Slot#2
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI, Slot#3
TOP DRIVE BAY
ECG
FP USB
MIDDLE DRIVE BAY
MOD
PCI, Slot#4
PCIe x1, Slot#6
BOTTOM DRIVE BAY
DVD RW
IDE #2
PCIe express x16, Slot#8
PCIe x1, Slot#7
UPS BATTERY
10/100bT
USB1/2
USB3/4
USB5/6
POWER
512 MB DIMM
512 MB DIMM
Motherboard SVGA
COM1
CPU Fan
CPU
PARALLEL
Front Panel Header
Chassis Rear Fan
UPS
AC POWER
ATX POWER SUPPLY
S/C VIDEO OUT
SVGA OUT 2
PCIO Board
POWER CONTROL
FAN quick disconnect
FRONT CHASSIS FAN
SVGA IN
SVGA OUT 1
RGB OUT
PCVIC Board

PC2IP3 HAS BEEN INTRODUCED IN MANUFACTORING.

Figure 5-49 BEP4 (Replacement for BEP2) - Block Diagram

5-4-5-6 BEP3.2 without 4D - Block Diagram

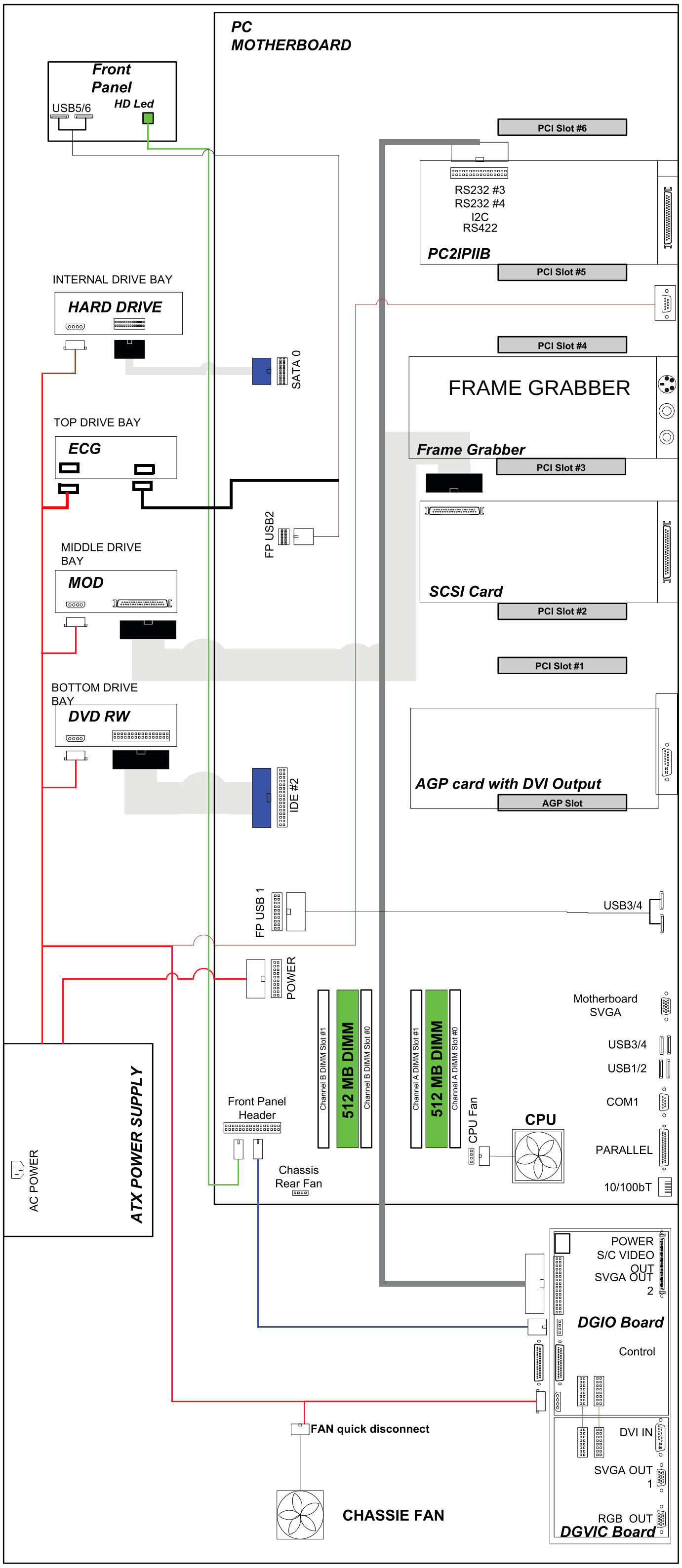

PC
MOTHERBOARD
Front
Panel
USB5/6
HD Led
PCI Slot #6
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI Slot #5
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
PCI Slot #4
FRAME GRABBER
Frame Grabber
PCI Slot #3
TOP DRIVE BAY
ECG
FP USB2
SCSI Card
PCI Slot #2
MIDDLE DRIVE
BAY
MOD
PCI Slot #1
BOTTOM DRIVE
BAY
DVD RW
IDE #2
AGP card with DVI Output
AGP Slot
FP USB 1
USB3/4
POWER
Motherboard
SVGA
USB3/4
USB1/2
COM1
PARALLEL
10/100bT
Channel B DIMM Slot #1
512 MB DIMM
Channel B DIMM Slot #0
Channel A DIMM Slot #1
512 MB DIMM
Channel A DIMM Slot #0
CPU Fan
CPU
Front Panel
Header
Chassis
Rear Fan
AC POWER
ATX POWER SUPPLY
POWER
S/C VIDEO
OUT
SVGA OUT
2
DGIO Board
Control
FAN quick disconnect
DVI IN
SVGA OUT
1
RGB OUT
DGVIC Board
CHASSIE FAN

Figure 5-50 CPU/Back-End Processor Block Diagram (BEP3.2 without 3D)

5-4-5-7 BEP3.2 with 4D - Block Diagram

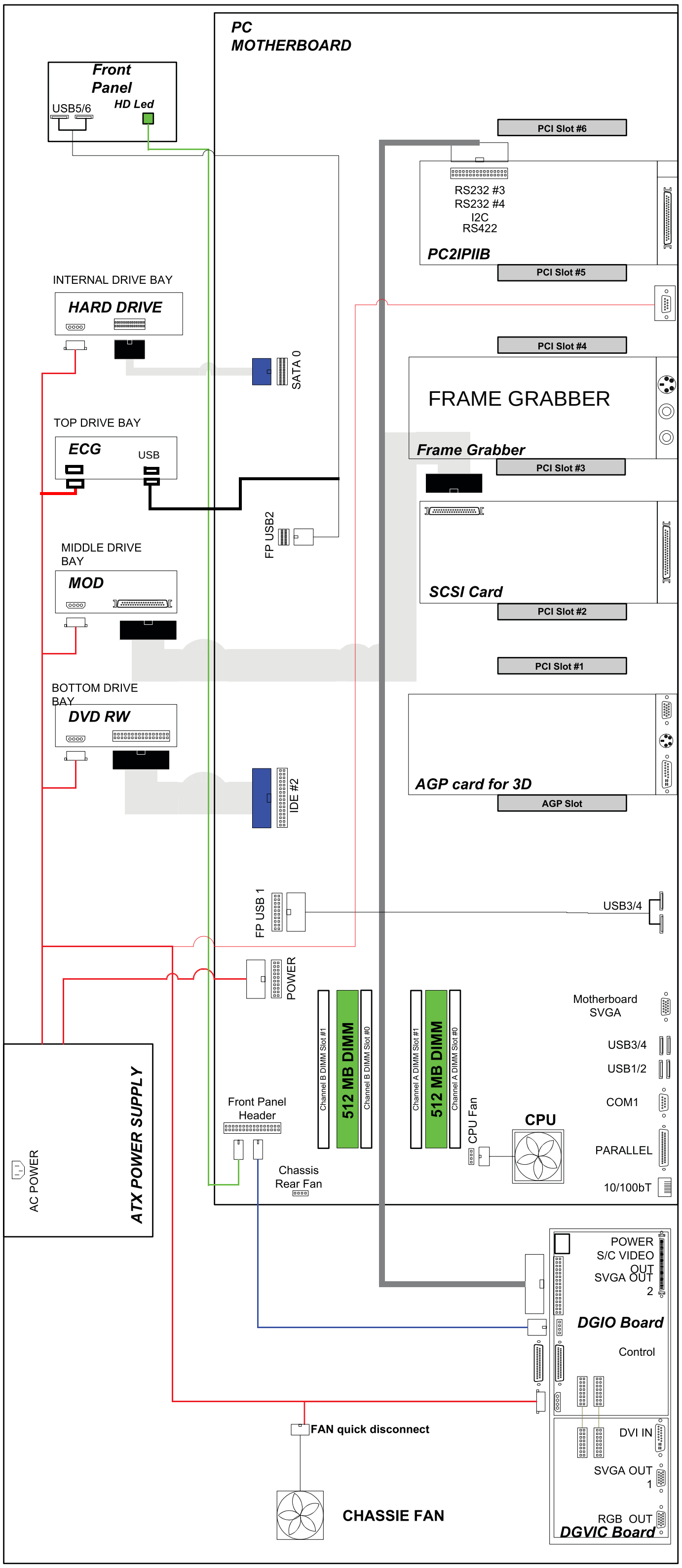

PC
MOTHERBOARD
Front
Panel
USB5/6
HD Led
PCI Slot #6
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI Slot #5
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
PCI Slot #4
FRAME GRABBER
Frame Grabber
PCI Slot #3
TOP DRIVE BAY
ECG
USB
FP USB2
SCSI Card
PCI Slot #2
MIDDLE DRIVE
BAY
MOD
PCI Slot #1
BOTTOM DRIVE
BAY
DVD RW
AGP card for 3D
AGP Slot
IDE #2
FP USB 1
USB3/4
POWER
Channel B DIMM Slot #1
512 MB DIMM
Channel B DIMM Slot #0
Channel A DIMM Slot #1
512 MB DIMM
Channel A DIMM Slot #0
CPU Fan
CPU
Motherboard
SVGA
USB3/4
USB1/2
COM1
PARALLEL
10/100bT
Front Panel
Header
Chassis
Rear Fan
AC POWER
ATX POWER SUPPLY
POWER
S/C VIDEO
OUT
SVGA OUT
2
DGIO Board
Control
DVI IN
SVGA OUT
1
RGB OUT
DGVIC Board
FAN quick disconnect
CHASSIE FAN

Figure 5-51 CPU/Back-End Processor Block Diagram (BEP3.2 with 3D)

5-4-5-8 BEP3 without 4D - Block Diagram

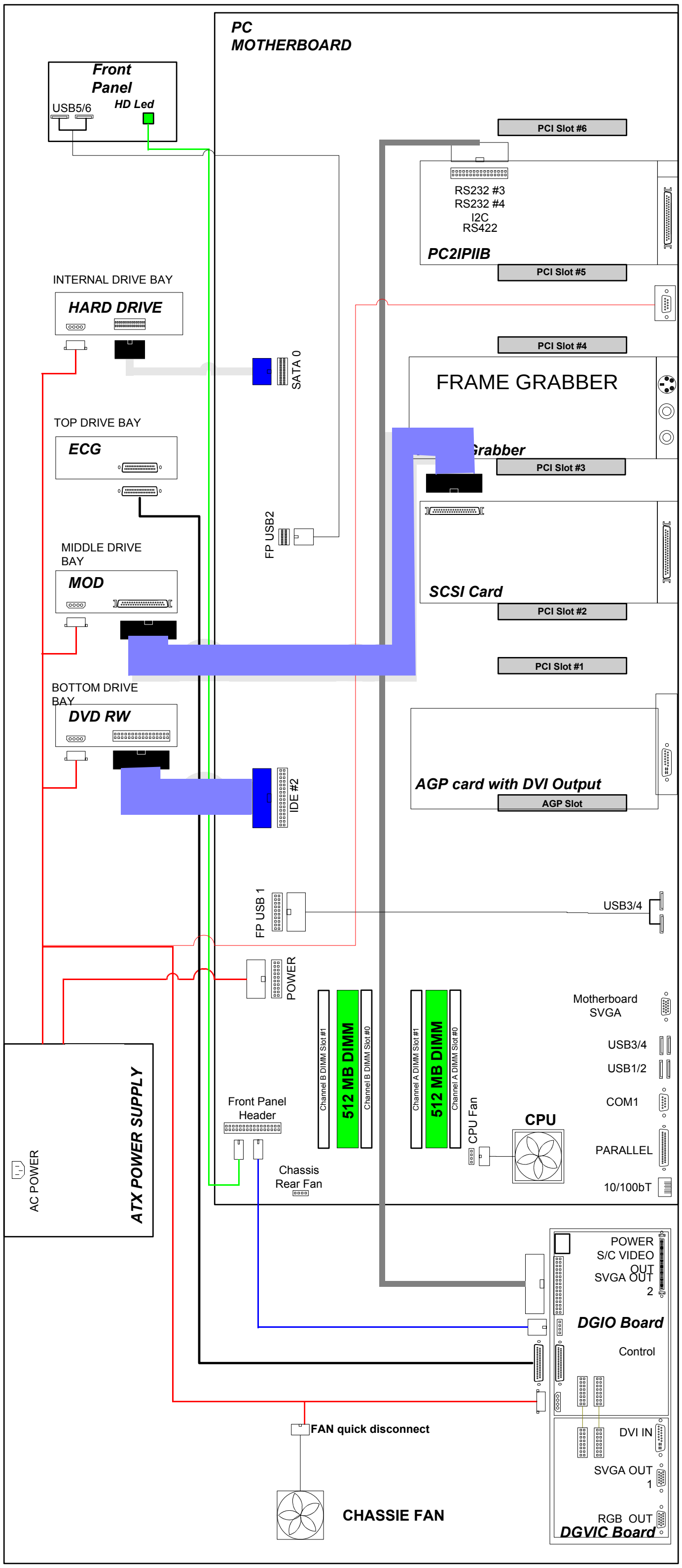

PC MOTHERBOARD
Front Panel
USB5/6
HD Led
PCI Slot #6
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI Slot #5
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
PCI Slot #4
FRAME GRABBER
Grabber
PCI Slot #3
TOP DRIVE BAY
ECG
FP USB2
SCSI Card
PCI Slot #2
MIDDLE DRIVE BAY
MOD
PCI Slot #1
BOTTOM DRIVE BAY
DVD RW
AGP card with DVI Output
AGP Slot
IDE #2
FP USB 1
USB3/4
POWER
Channel B DIMM Slot #1
512 MB DIMM
Channel B DIMM Slot #0
Channel A DIMM Slot #1
512 MB DIMM
Channel A DIMM Slot #0
CPU Fan
CPU
Motherboard SVGA
USB3/4
USB1/2
COM1
PARALLEL
10/100bT
Front Panel Header
Chassis Rear Fan
AC POWER
ATX POWER SUPPLY
POWER
S/C VIDEO OUT
SVGA OUT 2
DGIO Board
Control
FAN quick disconnect
DVI IN
SVGA OUT 1
RGB OUT
DGVIC Board
CHASSIE FAN

Figure 5-52 CPU/Back-End Processor Block Diagram (BEP3 without 3D)

5-4-5-9 BEP3 with 4D - Block Diagram

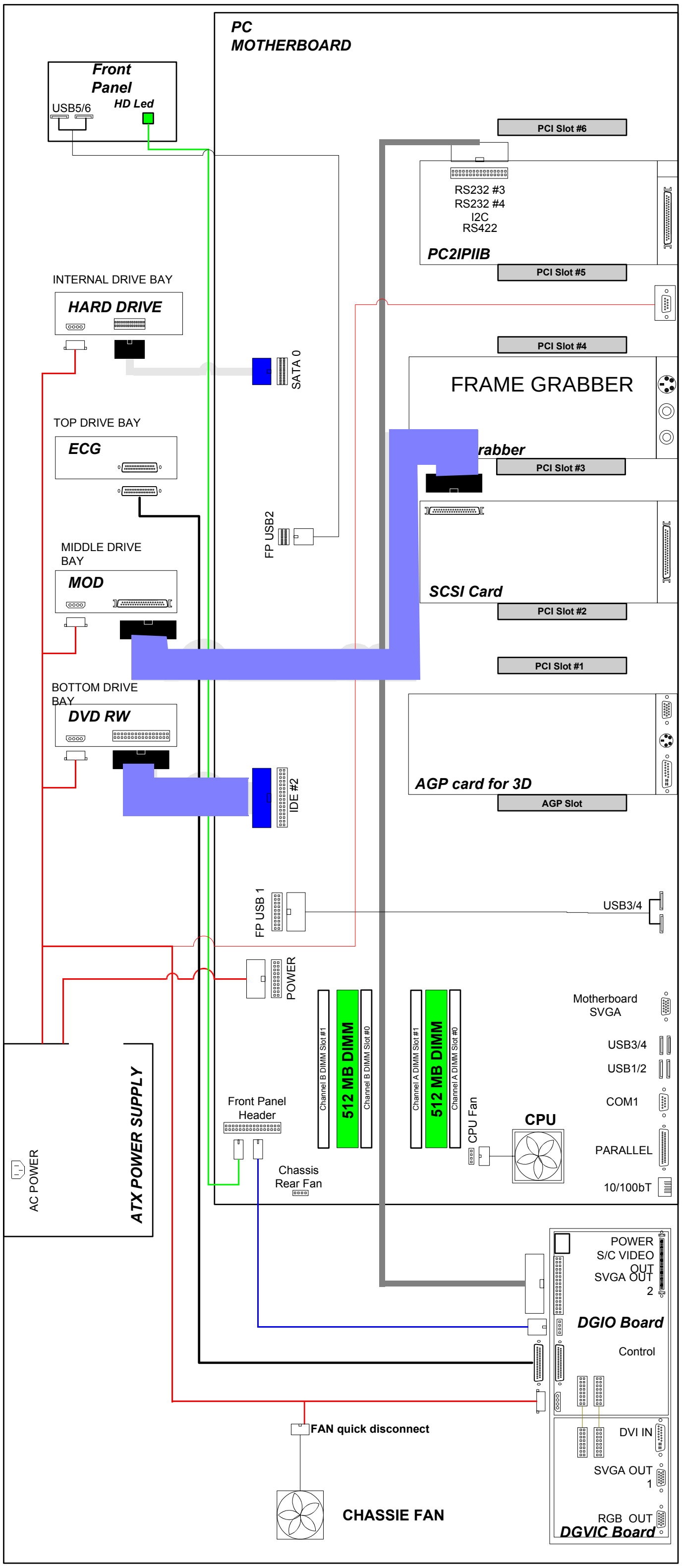

PC
MOTHERBOARD
Front
Panel
USB5/6
HD Led
PCI Slot #6
RS232 #3
RS232 #4
I2C
RS422
PC2IPIIB
PCI Slot #5
INTERNAL DRIVE BAY
HARD DRIVE
SATA 0
PCI Slot #4
FRAME GRABBER
rabber
PCI Slot #3
TOP DRIVE BAY
ECG
FP USB2
MIDDLE DRIVE
BAY
MOD
SCSI Card
PCI Slot #2
PCI Slot #1
BOTTOM DRIVE
BAY
DVD RW
AGP card for 3D
AGP Slot
IDE #2
FP USB 1
USB3/4
POWER
Motherboard
SVGA
USB3/4
USB1/2
COM1
PARALLEL
10/100bT
Channel B DIMM Slot #1
512 MB DIMM
Channel B DIMM Slot #0
Channel A DIMM Slot #1
512 MB DIMM
Channel A DIMM Slot #0
CPU Fan
CPU
Front Panel
Header
Chassis
Rear Fan
AC POWER
ATX POWER SUPPLY
POWER
S/C VIDEO
OUT
SVGA OUT
2
DGIO Board
Control
FAN quick disconnect
DVI IN
SVGA OUT
1
RGB OUT
DGVIC Board
CHASSIE FAN

Figure 5-53 CPU/Back-End Processor Block Diagram (BEP3 with 3D)

5-4-5-10 BEP2.2 Block Diagram

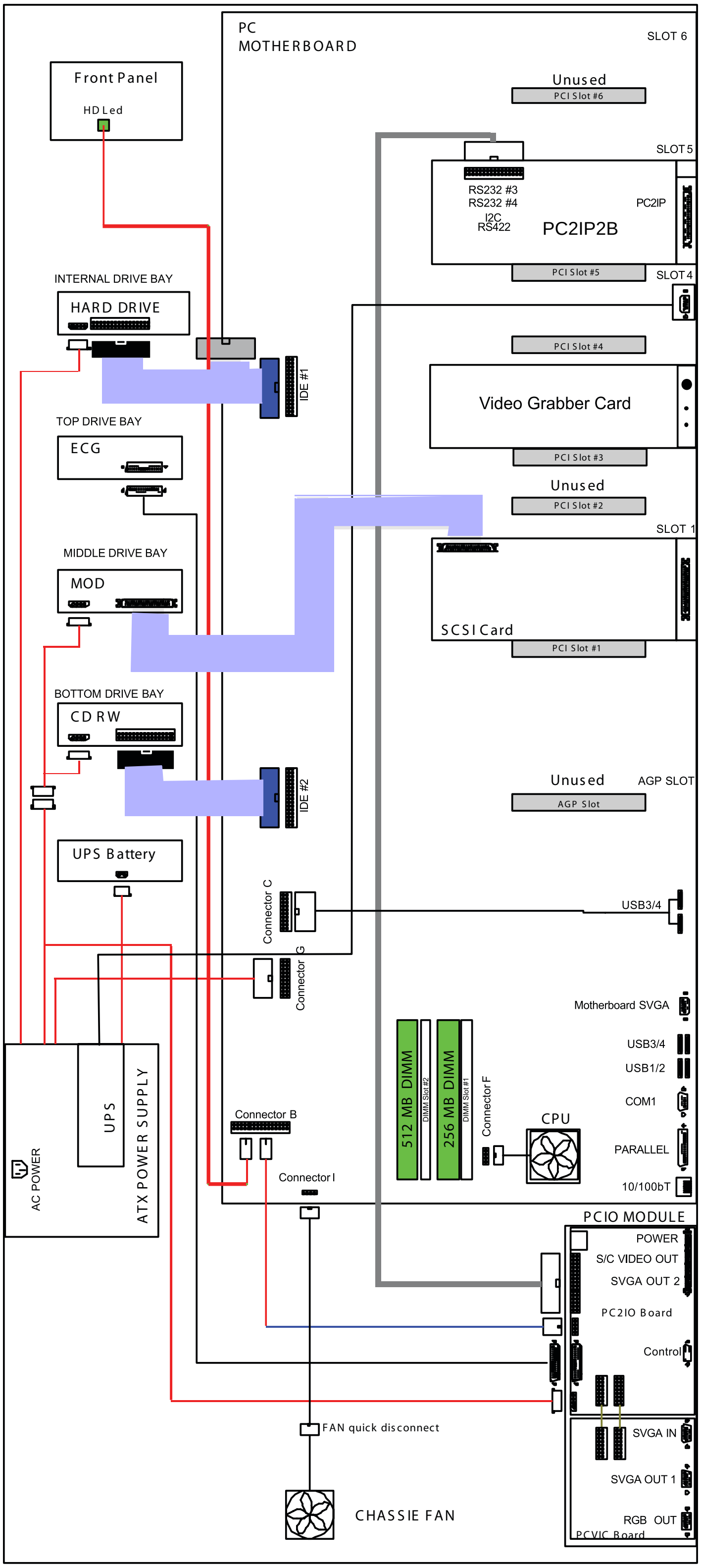

PC
MOTHERBOARD
SLOT 6
Unused
PCI Slot #6
SLOT 5
RS232 #3
RS232 #4
I2C
RS422
PC2IP
PC2IP2B
PCI Slot #5
SLOT 4
PCI Slot #4
Video Grabber Card
PCI Slot #3
Unused
PCI Slot #2
SLOT 1
SCSI Card
PCI Slot #1
Unused
AGP SLOT
AGP Slot
Front Panel
HD Led
INTERNAL DRIVE BAY
HARD DRIVE
IDE #1
TOP DRIVE BAY
ECG
MIDDLE DRIVE BAY
MOD
BOTTOM DRIVE BAY
CD RW
IDE #2
UPS Battery
Connector C
Connector G
USB3/4
Motherboard SVGA
USB3/4
USB1/2
COM1
PARALLEL
10/100bT
512 MB DIMM
DIMM Slot #2
256 MB DIMM
DIMM Slot #1
Connector F
CPU
Connector B
Connector I
AC POWER
UPS
ATX POWER SUPPLY
PCIO MODULE
POWER
S/C VIDEO OUT
SVGA OUT 2
PC2IO Board
Control
SVGA IN
SVGA OUT 1
RGB OUT
PCVIC Board
FAN quick disconnect
CHASSIE FAN

Figure 5-54 CPU/Back-End Processor Block Diagram (BEP 2.2)

5-4-5-11 BEP2 Block Diagram

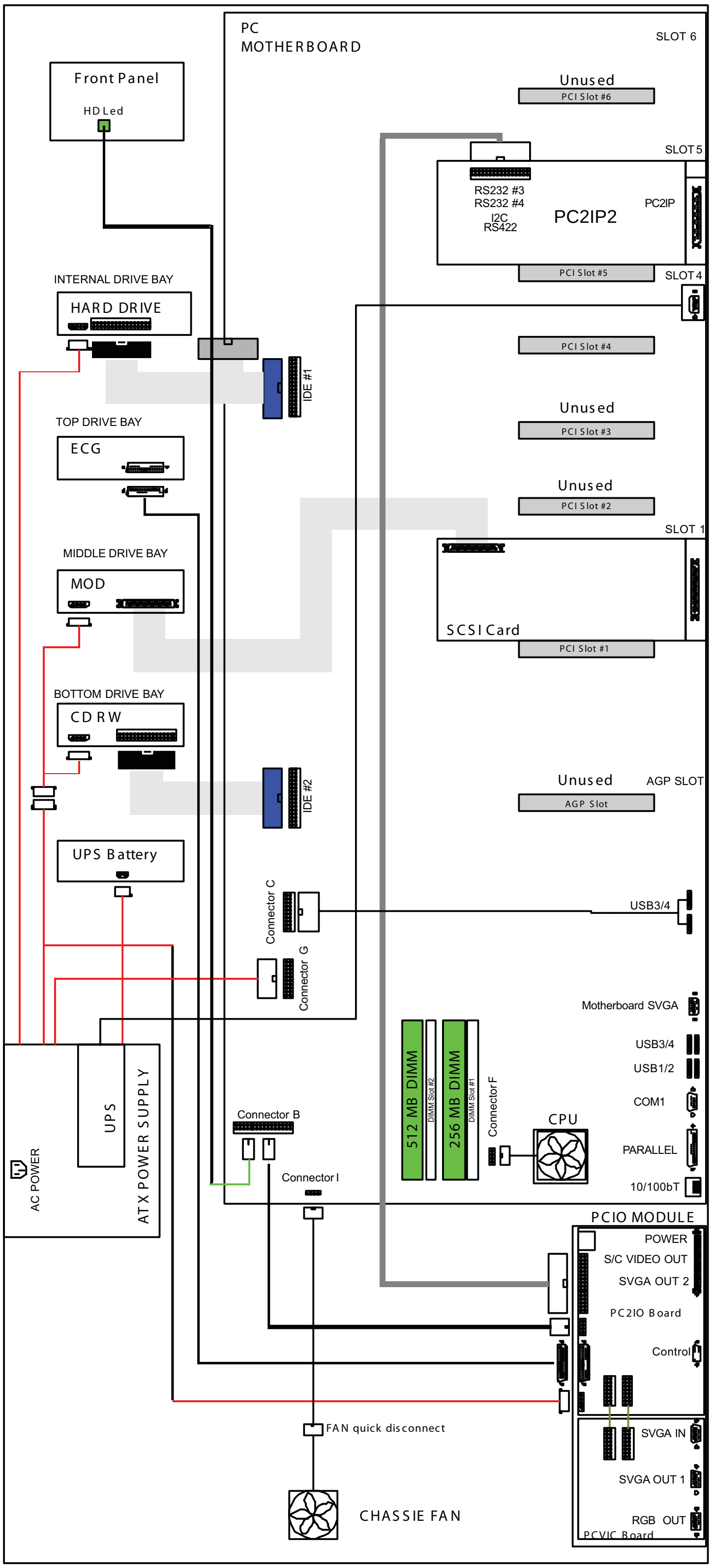

PC MOTHERBOARD
SLOT 6
Unused
PCI Slot #6
Front Panel
HD Led
SLOT 5
RS232 #3
RS232 #4
I2C
RS422
PC2IP2
PC2IP
PCI Slot #5
SLOT 4
INTERNAL DRIVE BAY
HARD DRIVE
PCI Slot #4
IDE #1
TOP DRIVE BAY
ECG
Unused
PCI Slot #3
Unused
PCI Slot #2
SLOT 1
MIDDLE DRIVE BAY
MOD
SCSI Card
PCI Slot #1
BOTTOM DRIVE BAY
CD RW
Unused
AGP SLOT
AGP Slot
IDE #2
UPS Battery
Connector C
USB3/4
Connector G
Motherboard SVGA
USB3/4
USB1/2
512 MB DIMM
DIMM Slot #2
256 MB DIMM
DIMM Slot #1
Connector F
COM1
UPS
ATX POWER SUPPLY
AC POWER
Connector B
CPU
PARALLEL
Connector I
10/100bT
PCIO MODULE
POWER
S/C VIDEO OUT
SVGA OUT 2
PC2IO Board
Control
FAN quick disconnect
SVGA IN
SVGA OUT 1
CHASSIE FAN
RGB OUT
PCVIC Board

Figure 5-55 CPU/Back-End Processor Block Diagram (BEP 2)

5-4-5-12 BEP1 Block Diagram

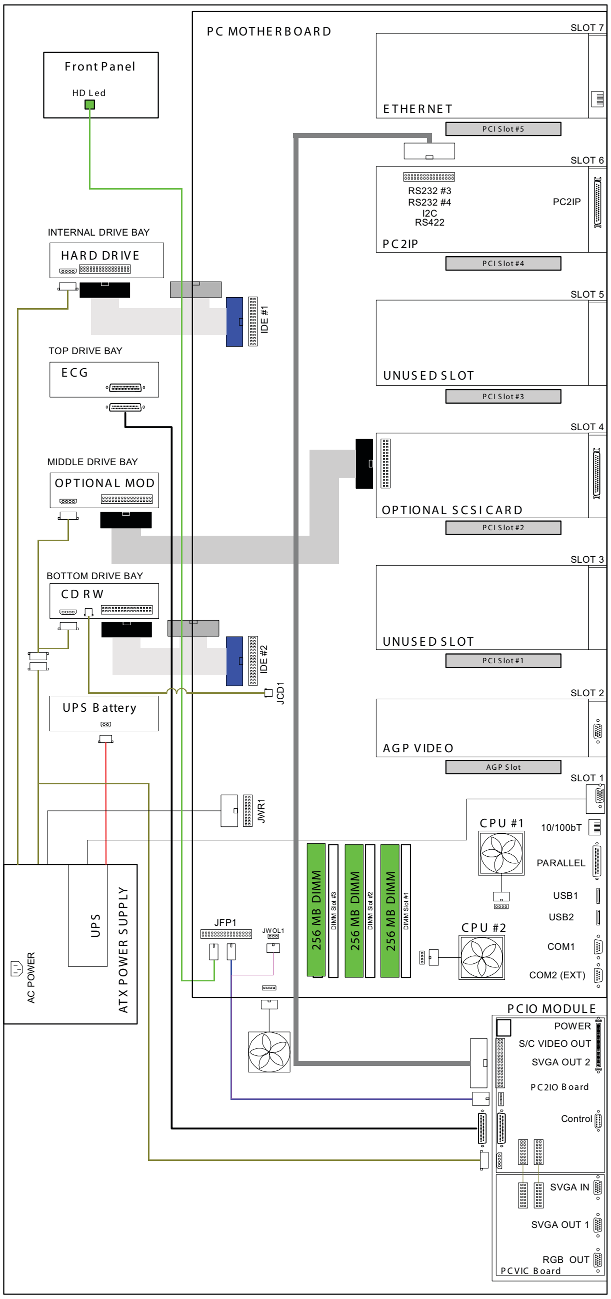

PC MOTHERBOARD
Front Panel
HD Led
INTERNAL DRIVE BAY
HARD DRIVE
IDE #1
TOP DRIVE BAY
ECG
MIDDLE DRIVE BAY
OPTIONAL MOD
BOTTOM DRIVE BAY
CD RW
IDE #2
JCD1
UPS Battery
JWR1
AC POWER
UPS
ATX POWER SUPPLY
JFP1
JWOL1
SLOT 7
ETHERNET
PCI Slot #5
SLOT 6
RS232 #3
RS232 #4
I2C
RS422
PC2IP
PC2IP
PCI Slot #4
SLOT 5
UNUSED SLOT
PCI Slot #3
SLOT 4
OPTIONAL SCSI CARD
PCI Slot #2
SLOT 3
UNUSED SLOT
PCI Slot #1
SLOT 2
AGP VIDEO
AGP Slot
SLOT 1
CPU #1
10/100bT
PARALLEL
USB1
USB2
CPU #2
COM1
COM2 (EXT)
256 MB DIMM
DIMM Slot #3
256 MB DIMM
DIMM Slot #2
256 MB DIMM
DIMM Slot #1
PCIO MODULE
POWER
S/C VIDEO OUT
SVGA OUT 2
PC2IO Board
Control
SVGA IN
SVGA OUT 1
RGB OUT
PCVIC Board

Figure 5-56 CPU/Back-End Processor Block Diagram (BEP1)

5-4-6 Back-End Processor (BEP) Descriptions

5-4-6-1 BEP4 Versions Description

NOTE: *Specifications mentioned about the Back-End Processor (BEP4) are minimum requirements. The actual hardware could exceed these specifications as technology advances.*

NOTE: *BEP4.3 is released for the BT'08 introduction. It has a 160 GB hard disk drive and a new DVD-R/W drive. Other specifications are the same as BEP4.2.*

The EMC Enclosure House

Table 5-60 Contents in the BEP4.x EMC Enclosure House

DESCRIPTION	BEP4.2	BEP4.0 USED AS BEP2.2 REPLACEMENT	BEP4.0 AS BEP2.0 AND BEP1 REPLACEMENT
POWER SUPPLY WITH UPS BATTERY BACKUP	NO	YES	YES
POWER SUPPLY WITHOUT UPS BATTERY BACKUP	YES	NO	NO
MOTHERBOARD WITH 1 GBYTES OF RAM AND A SINGLE 3.4 GHZ P4 PROCESSOR.	YES	NO	NO
MOTHERBOARD WITH 1 GBYTES OF RAM AND A SINGLE 3.4 GHZ P4 PROCESSOR DOWNCLOCKED TO 2.2 GHZ	NO	YES	YES
SIX (6X) USB PORTS ON THE REAR PANEL AND ONE (1X) LOCATED ON THE FRONT OF THE BEP4.X,	YES	YES	YES
ONE SERIAL (RS-232C) PORT	YES	YES	YES
AGP ANALOG VIDEO OUTPUT FROM THE MOTHERBOARD	NO	YES	YES
ANALOG GFX VIDEO OUTPUT FROM THE MOTHERBOARD	YES	NO	NO
PCIexpress DVI 4D Gfx card (ONLY FOR 4D)	YES	N/A	N/A
VIDEO FRAME GRABBER CARD	YES	YES	NO
LAN OUTPUT FROM THE MOTHERBOARD (10/100/1000 BASE T)	YES	YES	YES

5-4-6-2 BEP3.x Description

NOTE: *Specifications mentioned about the Back-End Processor (BEP3.x) are minimum requirements. The actual hardware could exceed these specifications as technology advances.*

5-4-6-2-1 The EMC Enclosure House

- A Power Supply (no UPS battery backup)
- An Intel Motherboard with 1 Gbytes of RAM and a single 3.2 GHz P4 processor.
- Six (6x) USB Ports.
    - 2x are located on the front of the BEP3
    - 4x are located at the rear of the BEP3
- One (1x) Serial Port
- AGP Analog Video output from the motherboard
- AGP Card (MOLEX) with DVI output (without 4D)
  or
  AGP Card (ATI) with DVI output (4D) in AGP slot
- Video Frame Grabber Card
- LAN output from the motherboard (10/100 Base T)
- Patient I/O:
    - BEP3.0 supports the original serial databus (not USB)
    - BEP3.2 Supports USB 1.1

5-4-6-2-2 Use of Expansion Slots on Motherboard

Table 5-61 Expansion Slots Usage BEP 3.x

SLOT #	FUNCTION	INTERFACE	NOTES
AGP	ADD VIDEO CARD WITH DVI OUTPUT	AGP	DIFFERENT TYPES USED FOR UNITS WITHOUT AND WITH 4D
1	UNUSED	PCI	
2	SCSI CARD	PCI	
3	PRAME GRABBER	PCI	
4	UNUSED	PCI	
5	PC2IPIIB	PCI	
6	UNUSED	PCI	

5-4-6-3 BEP2.2 Description

NOTE: *Specifications mentioned about the Back-End Processor (BEP2.2) is minimum requirements. The actual hardware could exceed these specifications as technology advances.*

5-4-6-3-1 The EMC Enclosure house

- A Power Supply with UPS battery backup
- An Intel Motherboard with 768 Mbytes of RAM and a single 2.0 GHz P4 processor w/ 400 MHz FSB.
- Six (6x) USB Ports
- One (1x) Serial Port (COM1 used for modem (option) connection)
- AGP Video output from the motherboard (AGP Card Slot empty)
- Video Frame Grabber Card (Vivid 7 with FEP2)
- LAN output from the motherboard

5-4-6-3-2 Use of PCI slots on Motherboard

1.) SCSI Card for MO Drive (Optional)
2.) Blank
3.) Falcon Frame Grabber Card
4.) UPS Control (Not connected directly to MBD)
5.) PC2IP2 Card. PCI Bus interface for the Front-End Processor
6.) Blank

5-4-6-3-3 AGP Video - SVGA Video to the PCVIC Card

- Analog output complies with the SVGA specification.
- Resolution (on monitor) is 800x600.
- Support for 32 bit True Color
- Minimum of 8 Mbytes of high speed Video RAM, expandable to at least 16 Mbytes.
- 128-bit internal memory interface.
- Hardware supported asynchronous bit block transfer (80 Mpixels/sec.).

5-4-6-3-4 PC2IO Board

This board does not plug into any slot but is mounted to the inside of the BEP chassis.

  - Power and Internal PCI control signals.

5-4-6-4 BEP2 Description

NOTE: Specifications mentioned about the Back-End Processor (BEP2) is minimum requirements. The actual hardware could exceed these specifications as technology advances.

5-4-6-4-1 The EMC Enclosure house

- A Power Supply with UPS battery backup,
- An Intel Motherboard with 768 Mbytes of RAM and a single 2.0 GHz P4 processor w/ 400 MHz FSB.
- Six (6x) USB Ports
- One (1x) Serial Port (COM1 used for modem (option) connection)
- USB to Serial adapter cable (USB #3 to II/O B7) for External I/O serial output
- AGP Video output from the motherboard (AGP Card Slot is empty)
- LAN output from the motherboard

5-4-6-4-2 Use of PCI slots on Motherboard

1.) Blank
2.) SCSI Card for MO Drive (Optional)
3.) Blank
4.) PC2IP Card. PCI Bus interface for the Front-End Processor
5.) Blank

5-4-6-4-3 AGP Video Card - SVGA Video to the PCVIC Card

- Analog output complies with the SVGA specification.
- Resolution (on monitor) is 800x600.
- Support for 32 bit True Color
- Minimum of 8 Mbytes of high speed Video RAM, expandable to at least 16 Mbytes.
- 128-bit internal memory interface.
- Hardware supported asynchronous bit block transfer (80 Mpixels/sec.).

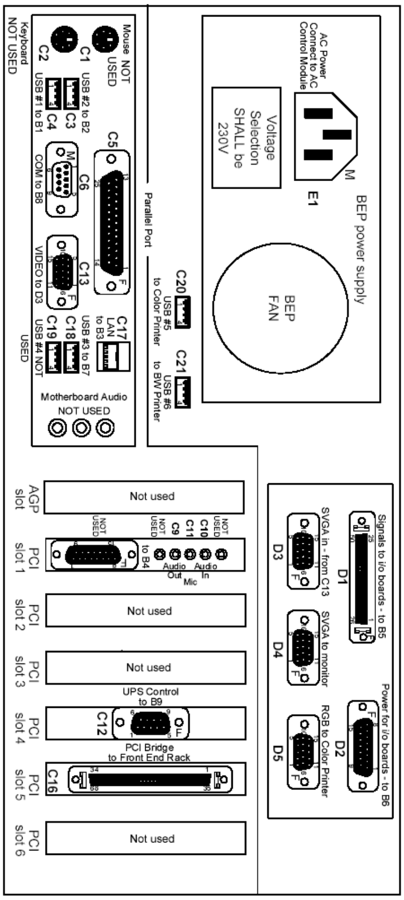
5-4-6-4-4 PC2IO Board

This board does not plug into any slot but is mounted to the inside of the BEP chassis.

  - Power and Internal PCI control signals

5-4-6-4-5 BEP-2 Back End Processor Cable Identification

Table 5-62 BEP-2 Back End Processor Cable Identification

	Connector Number	AGP/PCI Slot	Cable Function
	C1	**-**	Mouse - Not used.
	C2	-	Keyboard - Not used.
	C3	-	USB #2 to Internal I/O B2
	C4	-	USB #1 to Internal I/O B1
	C5	-	Parallel Port - Not Used
	C6	-	COM Port - Serial Port to Internal I/O B8
	C13	**-**	**Video to D3 PCVIC Input**
	C17	-	**LAN to Internal I/O B3**
	C18	**-**	**USB #3 Not Used**
	C19	-	USB #4 Not Used
	C20	-	USB #5 Not Used
	C21	-	USB #6 Not Used
		AGP Slot	Not Used
	C9	PCI Slot 1	Audio Out to Internal I/O B4 (Green)
	C10	PCI Slot 1	Audio In to Internal I/O B4 (Blue)
	C11	PCI Slot 1	Microphone to Internal I/O B4 (Pink) - Connected, but Not Used
		PCI Slot 2	Not Used
		PCI Slot 3	Not Used
	C12	PCI Slot 4	Power Supply UPS control - Connect to Internal I/O B9
	C16	PCI Slot 5	PCI Bridge to the Front End Card Rack
		PCI Slot 6	Not Used
	D1	PC2IO	Signals to I/O boards to Internal I/O B5
	D2	PC2IO	Power for I/O boards to Internal I/O B6
	D3	PCVIC	SVGA in from Back End Processor video board from C13
	D4	PCVIC	SVGA out to top console monitor
	D5	PCVIC	RGB out to color printer

Mouse NOT USED
C1
Keyboard NOT USED
C2
USB #2 to B2
C3
USB #1 to B1
C4
C5
C6
COM to B8
Parallel Port
VIDEO to D3
C13
C17
LAN to B3
C18
USB #3 to B7
C19
USB #4 NOT USED
Motherboard Audio NOT USED
C20
USB #5 to Color Printer
C21
USB #6 to BW Printer
AC Power Connect to AC Control Module
Voltage Selection SHALL be 230V
E1
BEP power supply
BEP FAN
AGP slot
Not used
PCI slot 1
NOT USED
C9
C10
C11
to B4
Audio Out
Mic
Audio In
PCI slot 2
Not used
PCI slot 3
Not used
UPS Control to B9
PCI slot 4
C12
PCI Bridge to Front End Rack
PCI slot 5
C16
PCI slot 6
Not used
D3
SVGA in - from C13
D1
Signals to i/o boards - to B5
D4
SVGA to monitor
D5
RGB to Color Printer
D2
Power for i/o boards - to B6

5-4-6-5 BEP1 Description

NOTE: *Specifications mentioned about the Back-End Processor (BEP1) is minimum requirements.*

5-4-6-5-1 Enclosure

The EMC enclosure houses an ATX Power Supply with UPS battery backup, an ATX style motherboard with minimum of 512 MB of RAM and two 733 MHz processors

5-4-6-5-2 PCI Cards

Five (5x) PCI slots on the Motherboard contains the following:

1.) Blank
2.) SCSI Card for MO Drive (Optional)
3.) Blank
4.) PC2IP Card -PCI Bus interface to the Front End Processor
5.) Network Interface Card - 3Com Ethernet Card

5-4-6-5-3 AGP Video Card - SVGA Video to the PCVIC Card

- Analog output complies with the SVGA specification.
- Resolution (on monitor) is 800x600.
- Support for 32 bit True Color
- Minimum of 8 Mbytes of high speed Video RAM, expandable to at least 16 Mbytes.
- 128-bit internal memory interface.
- Hardware supported asynchronous bit block transfer (80 Mpixels/sec.).

5-4-6-5-4 PC2IO Board

This board does not plug into any slot, but is mounted to the inside of the BEP’s chassis.

- Power and Internal PCI control signals
- Two (2x) USB Ports

5-4-6-5-5 BEP-1 Connector Reference

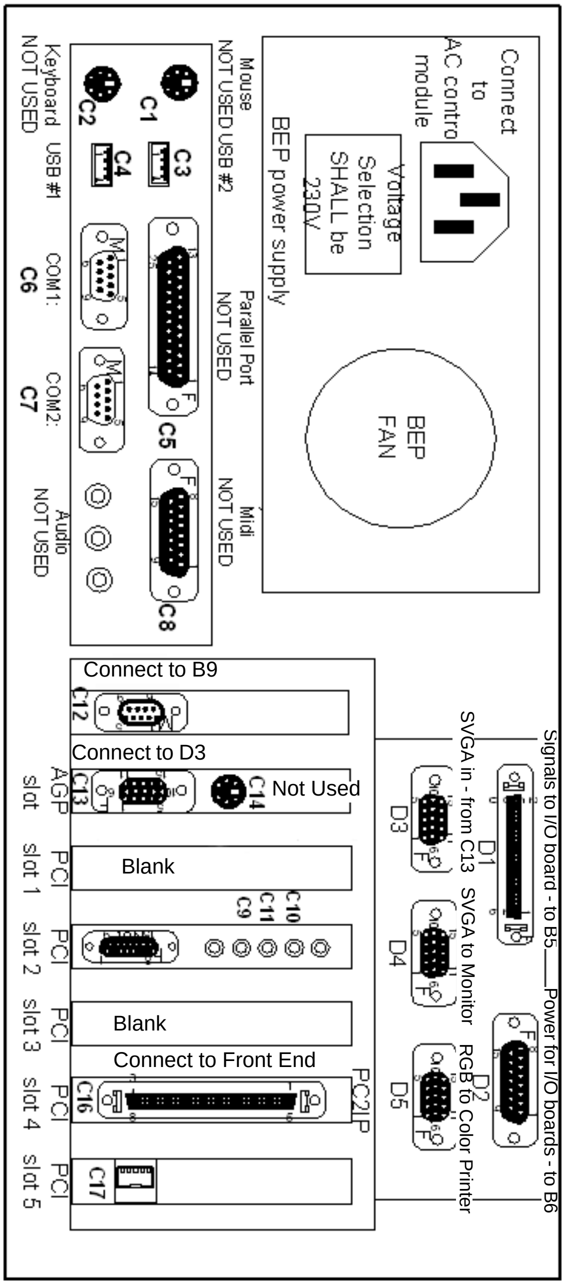

Connect to AC control module
Voltage Selection SHALL be 230V
BEP power supply
BEP FAN
Mouse NOT USED
C1
Keyboard NOT USED
C2
USB #2
C3
USB #1
C4
Parallel Port NOT USED
C5
COM1:
C6
COM2:
C7
Midi NOT USED
C8
Audio NOT USED
Connect to B9
C12
Connect to D3
C13
C14
Not Used
AGP slot
Blank
PCI slot 1
C10
C11
C9
PCI slot 2
Blank
PCI slot 3
Connect to Front End
C16
PCI slot 4
C17
PCI slot 5
PC2IP
Signals to I/O board - to B5
D1
Power for I/O boards - to B6
D2
SVGA in - from C13
D3
SVGA to Monitor
D4
RGB to Color Printer
D5

Figure 5-57 BEP-1 Connector Reference

5-4-7 Internal Storage Devices

- Hard Disk Drive (HDD) (inside the Back-End Processor cabinet.)
  - BEP4.3:
    Minimum 160 Gigabytes
  - BEP4.2:
    Minimum 80 Gigabyte
  - BEP3.x/BEP2.x:
    Minimum 40 Gigabyte EIDE Hard Disk Drive (HDD)
  - BEP1:
    Minimum 20 Gigabyte EIDE Hard Disk Drive (HDD)
- 5.25 inch Magneto-Optical Drive (MOD) available from front of scanner
  - Standard on Vivid 7 and Vivid 7 Dimension before BT’06
  - Option for Vivid 7 PRO and for Vivid 7 Dimension - BT’06 and onwards
- CD/DVD drive or CD drive
  - BEP4.2 and BEP3.x:
    CD/DVD R/W drive available from front of scanner.
    ONLY CD-R Disks and DVD Recordable disks are supported. (Not CD R/W or DVD R/W
  - BEP2.x and BEP1
    CD R/W Drive available from front of scanner. ONLY CD-R Disks are supported.

5-4-8 Back-End Processor (BEP) Inputs

5-4-8-1 AC Power

Table 5-63 AC Power

INPUT	DESCRIPTION	CONNECTION FROM
230 VAC	AC Power	AC Controller > Back-End Processor

5-4-8-2 DC Voltages

Table 5-64 DC Input Voltages

INPUT	DESCRIPTION	CONNECTED TO
+5Vstb	Standby voltage	DC Power Supply via Backplane
GND	Electrical Ground	DC Power Supply via Backplane and II/O

5-4-8 Back-End Processor (BEP) Inputs (cont'd)

5-4-8-3 Input Signals

Table 5-65 Input Signals

Signal Name	Description	Signal Path
PWR_OK*	Power verification signal from Front-End Card Cage	Front-End Card Cage > IIO > PC2IO
ON/OFF Switch	Signal from the ON/Standby switch on the Operator Panel and from the Reset Switch (behind hole) at the rear of the External I/O.	Top Console > IIO > PC2IO ON/OFF Reset (EIO) > IIO > PC2IO
I2C Register Interrupt	Interrupt signal from I2C Bus	EIO > IIO > PC2IO
Microphone in to BEP	Microphone signal from Monitor (Top Console)	Top Console > IIO > BEP
Audio in to BEP	Audio from VCR or Doppler Audio	Replay Audio from VCR > IIO > BEP Doppler Audio Out from Card Cage > IIO > BEP
S-Video from VCR	SVHS from VCR	Replay video from VCR > BEP

5-4-8-4 Bi-directional Signals

Table 5-66 Bi-directional Signals

Signal Name	Description	Signal Path
UPS Control RS232	Control Signals to and from the UPS	BEP > IIO
RS232 XDCTRL	Not Used	PC2IO > IIO > Not Used
I2C Bus	Data bus used for Remote Control of External Units and for reading module versions.	PC2IO > IIO > EIO
Spare RS232	Not Used	PC2IO > IIO > Not Used
VCR Remote Ctrl (RS232)	Control signal to Internal VCR	PC2IO > IIO > VCR
USB #1	USB bus to Top Console	PC2IO > IIO > Top Console
COM 1	Not Used	
COM 2	Modem (Option)	PC2IO > IIO > EIO (Rear of Module) > Modem
Ethernet	Standard TCP/IP Ethernet	BEP > IIO > EIO > External Network
USB #2	USB Bus for External Units	BEP > IIO > EIO > External USB Unit
USB #3	USB TO DIGITAL COLOR PRINTER	BEP > DIGITAL COLOR PRINTER
USB #4	USB TO DIGITAL GRAPHIC BW PRINTER	BEP > DIGITAL GRAPHIC BW PRINTER

5-4-9 Back-End Processor (BEP) Outputs

Table 5-67 Output Signals

Signal Name	Description	Signal Path
+5VDC	DC Voltage	PC2IO > IIO
+12VDC	DC Voltage	PC2IO > IIO
PS_ON*	Active Low	PC2IO > IIO > Card Cage
Standby		PC2IO > IIO > Top Console
SVideo	SVideo Out	PCVIC > PC2IO > IIO > EIO
CVideo	Composite Color Video	PCVIC > PC2IO > IIO > EIO
VGA	VGA High Resolution Video to External Video Screen	PCVIC > PC2IO > IIO > EIO
VGA	VGA High Resolution Video to Internal Video Screen (Top Console)	BEP > Top Console
BW Video RGB	BW Video from RGB. This signal is not used on Vivid 7	PCVIC > PC2IO > IIO > EIO This signal is not used on Vivid 7
Audio Out	Audio Out from BEP	BEP > IIO > Internal VCR BEP > IIO > EIO > External VCR
TRIG	Video Trig Signal	PC2IO > IIO > EIO

5-4-10 UPS Battery Description

The UPS Battery is used in these Back-End Processors:

- BEP1
- BEP2.0
- BEP2.2
- BEP4 used as BEP2.2 Replacement
- BEP4 used as BEP2.0 and BEP1 Replacement

The UPS batteries provide power to the Back-End Processor to enable a controlled shut down of the processor.

NOTE: *It is not possible to use the Vivid 7 for scanning or any other useful work without the mains power. The UPS battery is only used as a power source for the BEP so it can do a controlled shut down, or be in standby modus without AC Mains Power connected for a limited period of time, maximum 15 minutes.*

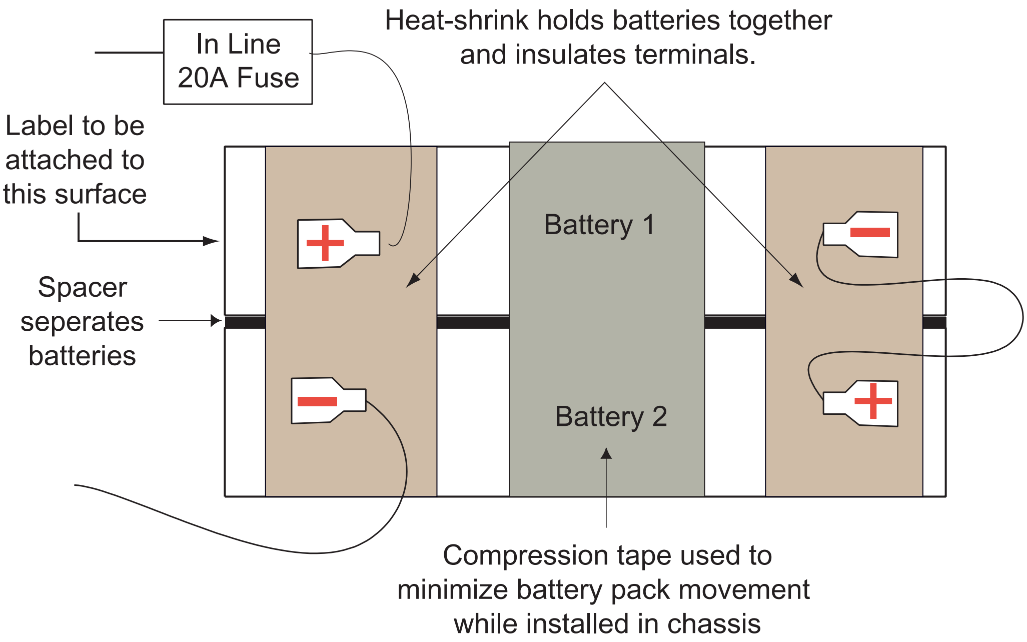

In Line 20A Fuse
Heat-shrink holds batteries together and insulates terminals.
Label to be attached to this surface
Spacer seperates batteries
Battery 1
Battery 2
+
−
−
+
Compression tape used to minimize battery pack movement while installed in chassis

Figure 5-58 Battery Block Diagram

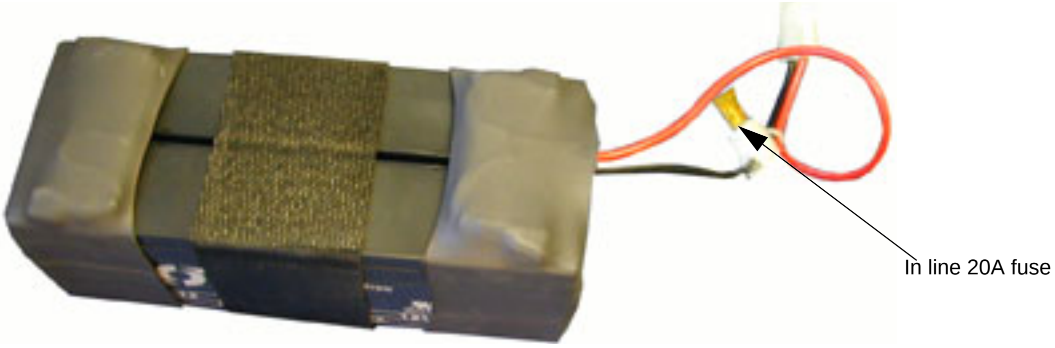

In line 20A fuse

Figure 5-59 Battery Pack

5-4-10 UPS Battery Description (cont'd)

The UPS batteries will drain slightly when the system is in the off condition. The off condition is defined as:

- Circuit Breaker in the OFF position
- System unplugged from the wall outlet

If the system is left in the OFF condition for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the UPS batteries. This could take 15 minutes to as long as 10 hours uninterrupted, depending on the battery age, system input voltage and system temperature. To eliminate draining the UPS batteries, the system should remain plugged into the wall outlet with the circuit breaker in the ON position.

Section 5-5
Patient I/O (Physio)

5-5-1 Patient I/O General Description

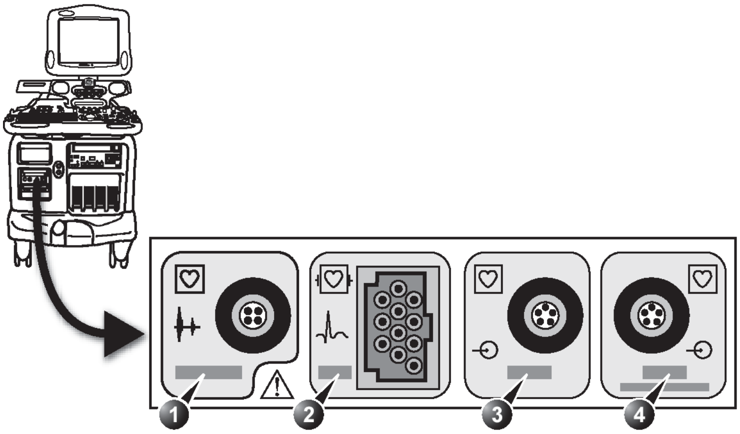


Figure 5-60 The Patient I/O Connector Panel

The Patient IO contains the electronics for (refer to Figure 5-60):

1.) Phono
2.) ECG/Respiration
3.) Analog inputs - AUX 1
4.) Analog inputs - AUX 2

The four inputs are separately isolated due to safety requirements.

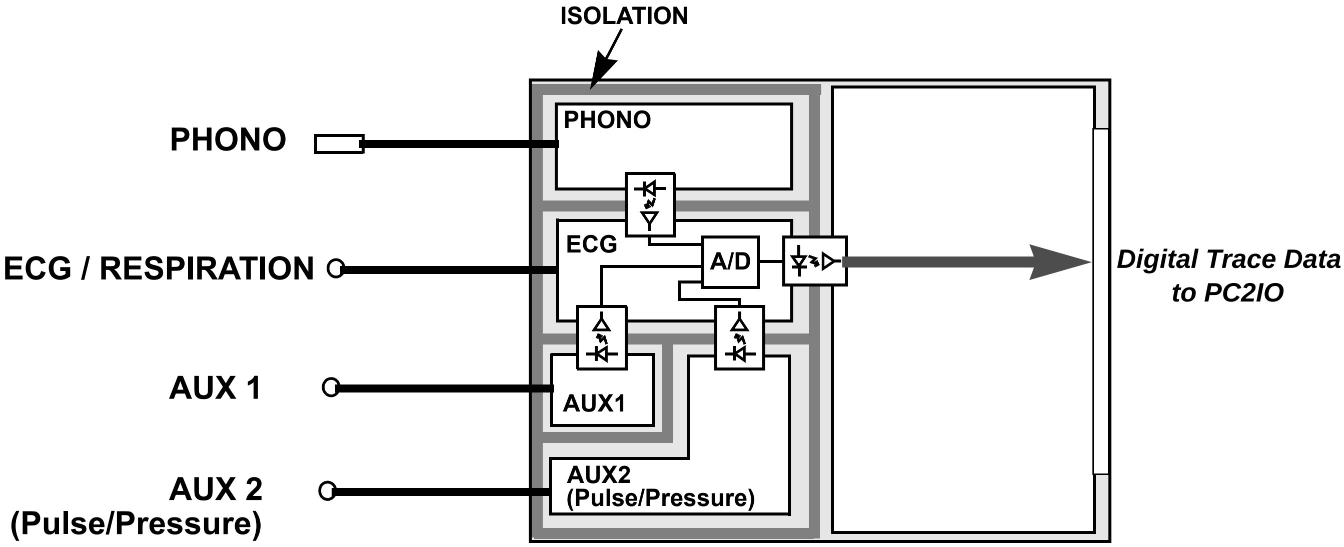

ISOLATION
PHONO
ECG / RESPIRATION
AUX 1
AUX 2
(Pulse/Pressure)
PHONO
ECG
A/D
AUX1
AUX2
(Pulse/Pressure)
Digital Trace Data
to PC2IO

Figure 5-61 Pat I/O - Block Diagram

5-5-1 Patient I/O General Description (cont'd)

The patient leads (for ECG) can be rotated by software (i.e. it is possible to change between Lead I, II and III by pushing a button).

The module extracts respiration from ECG signals from the ECG/Respiration input.

The scanned image that is displayed, is synchronized with the ECG, respiration and phono traces. In M-Mode or Doppler, the traces are synchronized to that particular mode's sweep. The operator can control the gain, the position and the sweep rate of the traces using the assignables on the control panel.

AUX2 is capable of handling a pulse/pressure signal.

5-5-2 Patient I/O Location in the Unit

The Patient I/O is located inside the Back-End Processor with the connector panel available from the front of the system.

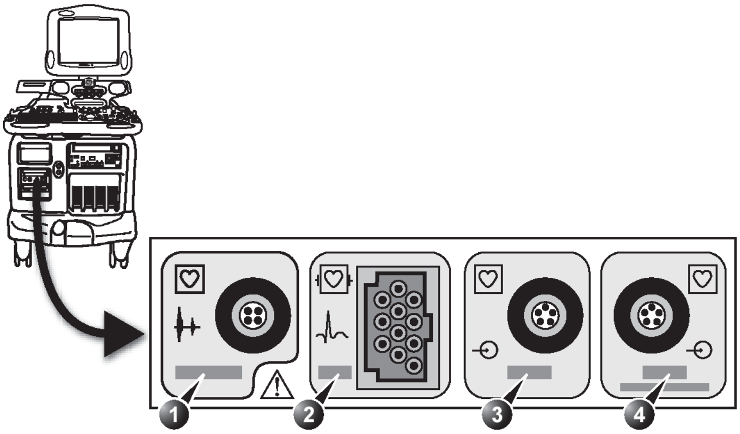


Figure 5-62 The Patient I/O - Location in the Unit

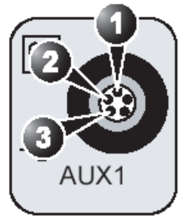
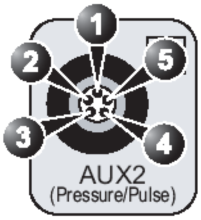
5-5-3 Patient I/O - Inputs

- ECG / Respiration
- Phono (from a phono heart microphone)
- Two Analog Inputs:
  - AUX1
  - AUX2 (Pulse/Pressure)

5-5-3-1 Pinout for the AUX Connectors

The pinout for the AUX connectors is described in the table below:

Table 5-68 Pinout for the AUX Connectors

CONNECTOR	SIGNAL NAME
	**AUX1** 1.) pin 1: input - 2.) pin 2: input + 3.) pin 3: gnd
	**AUX2** 1.) pin 1: input - 2.) pin 2: input + 3.) pin 3: gnd 4.) pin 4: nasal sensor 1 5.) pin 5: nasal sensor 2

Both AUX1 and AUX2 are by default 1 Vpp (Volt peak-peak) inputs with a max frequency of 300 Hz.

The inputs are differential. For a single ended sensor signal, the pin 1 (input -) should be connected to the GND (ground) of the sensor.

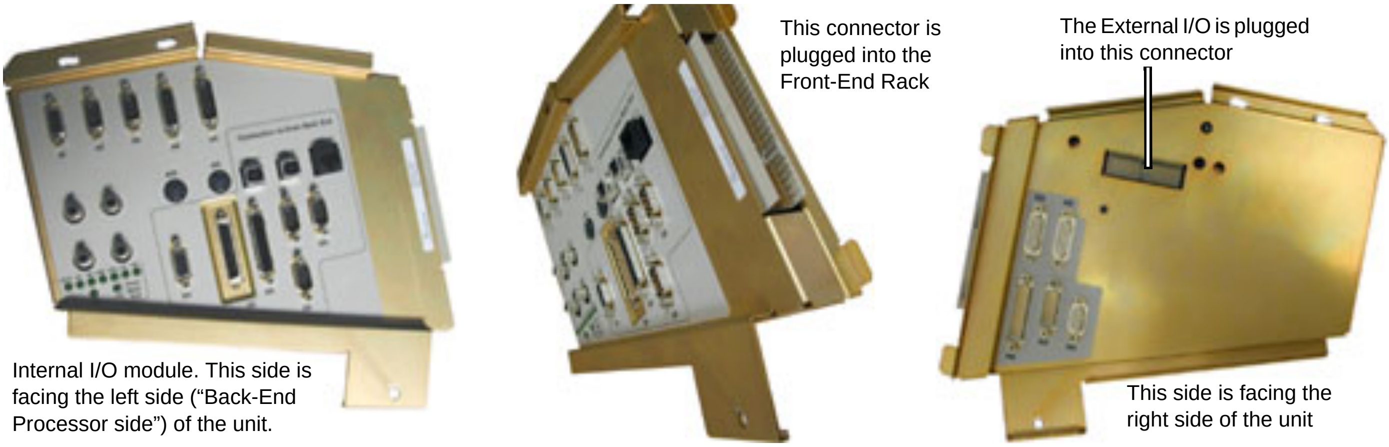
AUX2 has a programmable high gain mode with a maximum input signal of 300 mVpp (millivolt peak-peak).

5-5-4 Patient I/O - Outputs

- Serial Trace Data (SCSI bus) to PC2IO or DGIO.
  (This version is used on all BEP1, BEP-2.x, BEP3.0 and BEP4 used as replacement for BEP2.x.)
- Starting from the introduction of BT’05 and BEP3.2, a new Patient I/O module with USB-1.1 interface is used.
- Starting from BT’06 and BEP4.2, two Patient I/O models are supported:
  - Patient I/O module with USB-1.1 interface
  - Patient I/O module with USB-2.0 interface

Section 5-6
Internal I/O

5-6-1 General Description



This connector is plugged into the Front-End Rack

The External I/O is plugged into this connector

Internal I/O module. This side is facing the left side ("Back-End Processor side") of the unit.

This side is facing the right side of the unit

Figure 5-63 The Internal I/O module seen from different angles

The Internal I/O module (IIO) is the interface between the Front-End Processor (Card Cage), the Back-End Processor, and the rest of the system, including the Operator Panel (Top Console) and the Peripherals.

The IIO module performs buffering and distribution of DC power, video, audio and control data as described in this list:

- Video and audio signals are distribution between the Back-End Processor, External I/O, Top Console and peripherals.
- USB, Ethernet and RS232 signals are routed from the Back-End Processor to the External I/O for external communication.
- USB signals are routed between the Back-End Processor and the user interface.
- Serial Bus signals are routed from the Back-End Processor to control VCR and UPS.
- Signals for power control and fan control are routed through the module.

5-6-1 General Description (cont'd)

The IIO module has direct board-to-board connections with the:

- Front-End Processor's back plane
- External I/O module (EIO)

All other connections are done via cables.

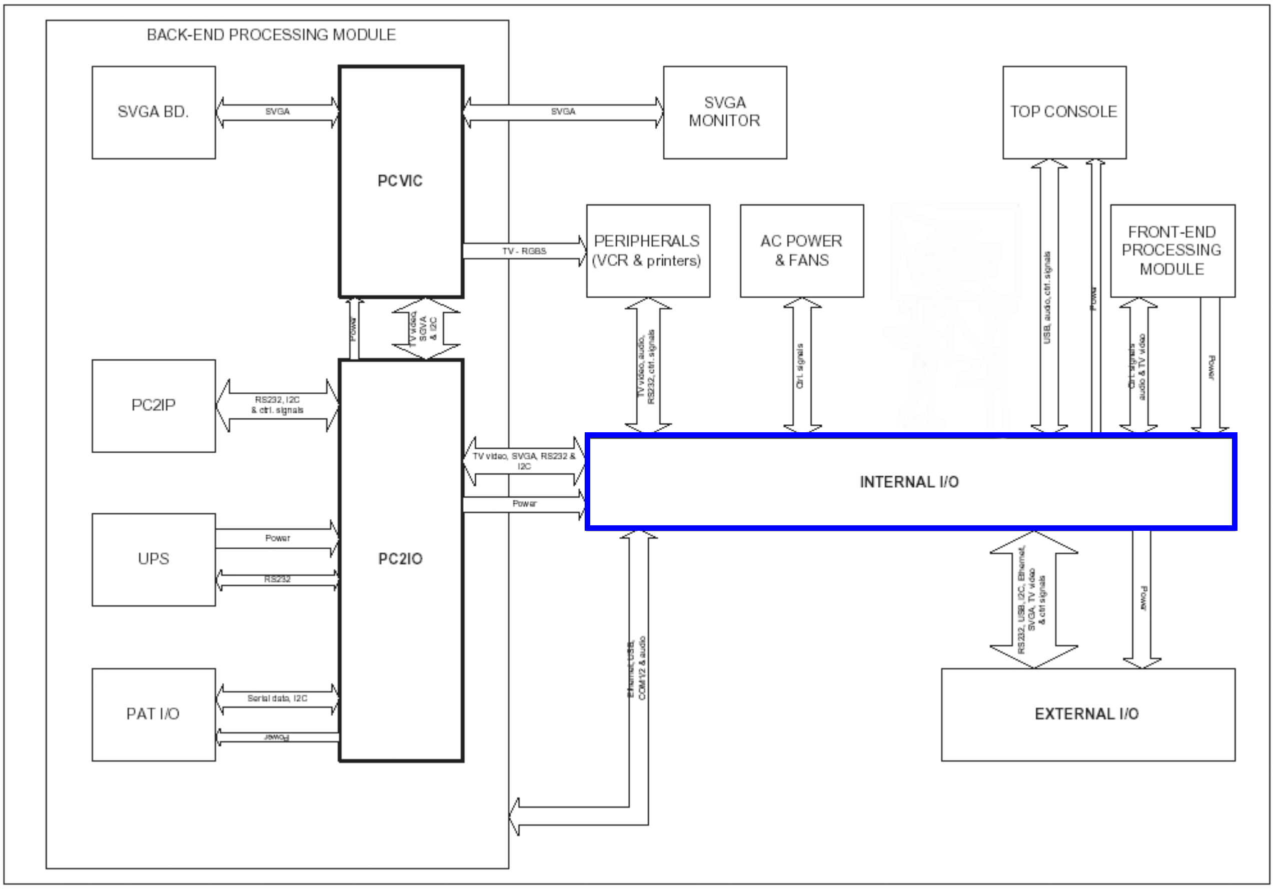

BACK-END PROCESSING MODULE
SVGA BD.
SVGA
PCVIC
SVGA
SVGA MONITOR
TOP CONSOLE
TV - RGBS
PERIPHERALS (VCR & printers)
AC POWER & FANS
FRONT-END PROCESSING MODULE
Power
TV video, SGVA & I2C
TV video, audio, RS232, ctrl. signals
Ctrl. signals
USB, audio, ctrl. signals
Power
Ctrl. signals audio & TV video
Power
PC2IP
RS232, I2C & ctrl. signals
TV video, SVGA, RS232 & I2C
Power
INTERNAL I/O
UPS
Power
RS232
PC2IO
RS232, USB, I2C, Ethernet, SVGA, TV video & ctrl signals
Power
Ethernet, USB, COM1/2 & audio
PAT I/O
Serial data, I2C
Power
EXTERNAL I/O

Figure 5-64 Internal I/O Basic Interconnect

5-6-1 General Description (cont'd)

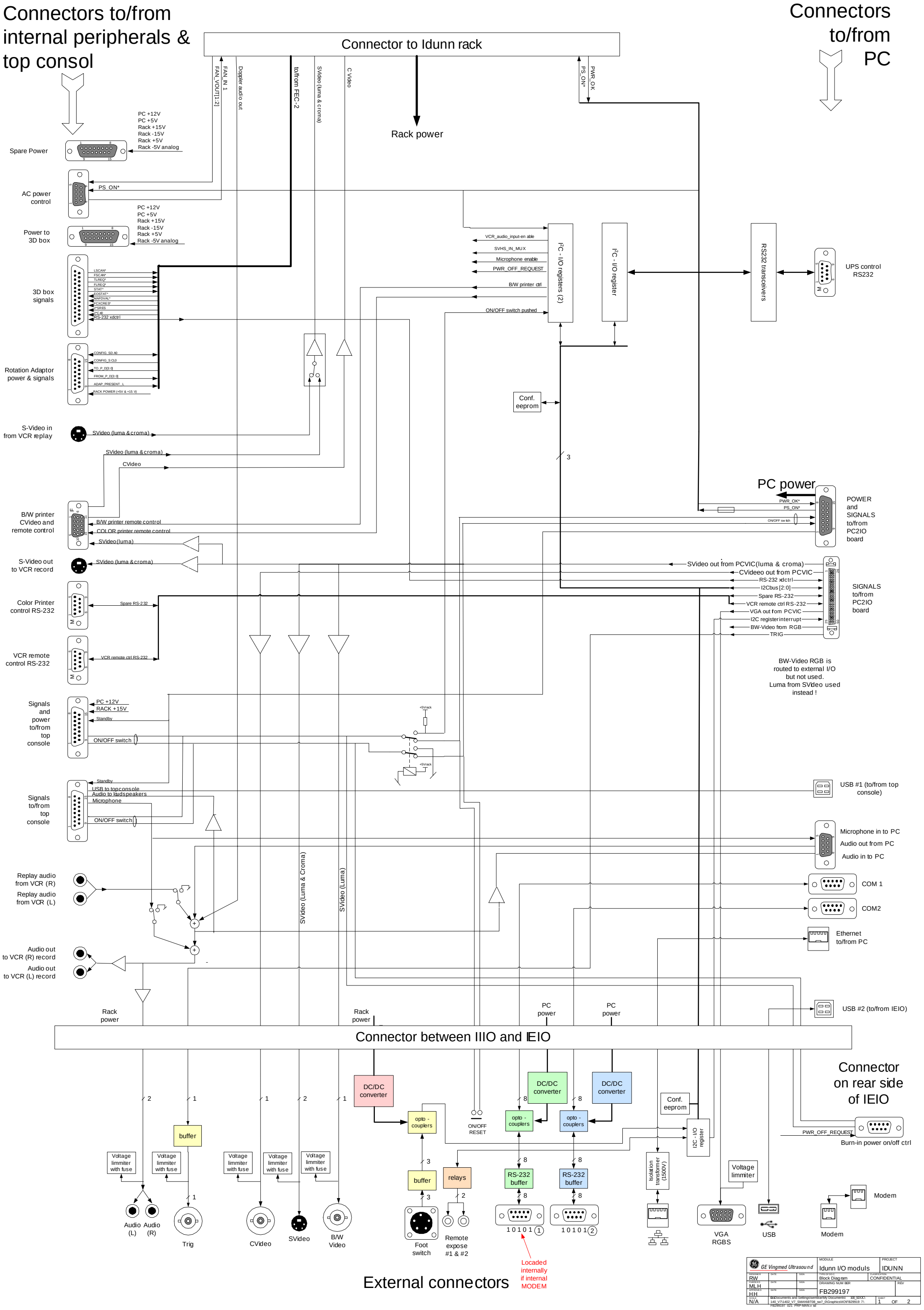
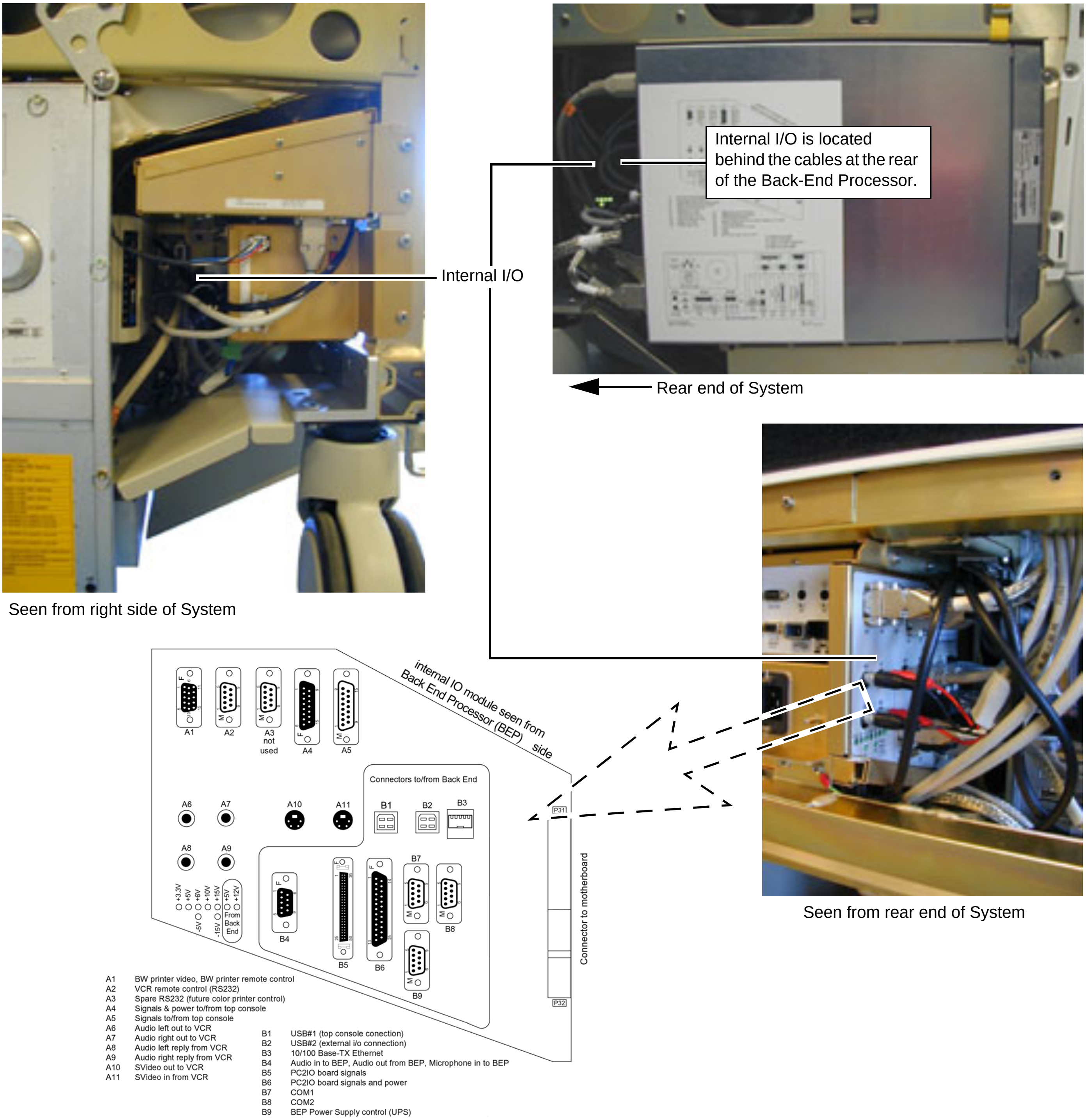

Connectors to/from internal peripherals & top consol
Connector to Idunn rack
Connectors to/from PC
FAN_VOUT[1:2]
FAN_IN 1
Doppler audio out
to/from FEC-2
SVideo (luma & croma)
C Video
Rack power
PWR_OK
PS_ON*
Spare Power
PC +12V
PC +5V
Rack +15V
Rack -15V
Rack +5V
Rack -5V analog
AC power control
PS_ON*
Power to 3D box
3D box signals
LSCAN*
FSCAN*
TLREQ*
FLREQ*
STAT*
EOSTAT*
MAFDVAL*
FCXCRES*
2*SRES
2*C40
RS-232 xdctrl
Rotation Adaptor power & signals
CONFIG_SDA0
CONFIG_SCL0
TO_P_D[3:0]
FROM_P_D[3:0]
ADAP_PRESENT_L
RACK POWER (+5V & +15 V)
S-Video in from VCR replay
SVideo (luma & croma)
CVideo
B/W printer CVideo and remote control
B/W printer remote control
COLOR printer remote control
SVideo (luma)
S-Video out to VCR record
Color Printer control RS-232
Spare RS-232
VCR remote control RS-232
VCR remote ctrl RS-232
Signals and power to/from top console
PC +12V
RACK +15V
Standby
ON/OFF switch
+5Vrack
Signals to/from top console
Standby
USB to topconsole
Audio to loudspeakers
Microphone
ON/OFF switch
Replay audio from VCR (R)
Replay audio from VCR (L)
Audio out to VCR (R) record
Audio out to VCR (L) record
SVideo (Luma & Croma)
SVideo (Luma)
VCR_audio_input-enable
SVHS_IN_MUX
Microphone enable
PWR_OFF_REQUEST
B/W printer ctrl
ON/OFF switch pushed
I²C - I/O registers (2)
I²C - I/O register
RS232 transceivers
UPS control RS232
Conf. eeprom
3
PC power
PWR_OK*
PS_ON*
ON/OFF switch
POWER and SIGNALS to/from PC2IO board
SVideo out from PCVIC(luma & croma)
CVideeo out from PCVIC
RS-232 xdctrl
I2Cbus[2:0]
Spare RS-232
VCR remote ctrl RS-232
VGA out fom PCVIC
I2C registerinterrupt
BW-Video from RGB
TRIG
SIGNALS to/from PC2IO board
BW-Video RGB is routed to external I/O but not used. Luma from SVideo used instead !
USB #1 (to/from top console)
Microphone in to PC
Audio out from PC
Audio in to PC
COM 1
COM2
Ethernet to/from PC
USB #2 (to/from IEIO)
Rack power
Rack power
PC power
PC power
Connector between IIIO and IEIO
2
1
1
2
1
8
8
8
8
8
8
3
3
2
1
DC/DC converter
DC/DC converter
DC/DC converter
opto - couplers
opto - couplers
opto - couplers
ON/OFF RESET
Conf. eeprom
I2C - I/O register
buffer
buffer
relays
RS-232 buffer
RS-232 buffer
Voltage limmiter with fuse
Voltage limmiter with fuse
Voltage limmiter with fuse
Voltage limmiter with fuse
Voltage limmiter with fuse
Isolation transformer (1500V)
Voltage limmiter
Connector on rear side of IEIO
PWR_OFF_REQUEST
Burn-in power on/off ctrl
Audio (L)
Audio (R)
Trig
CVideo
SVideo
B/W Video
Foot switch
Remote expose #1 & #2
1 0 1 0 1 ①
1 0 1 0 1 ②
Locaded internally if internal MODEM
VGA RGBS
USB
Modem
Modem
External connectors
GE Vingmed Ultrasound
MODULE
Idunn I/O moduls
PROJECT
IDUNN
DESIGNER
RW
CHECKED
MLH
APPROVED
HH
SCALE
N/A
DATE
SIGN
TYPE OF DOC
Block Diagram
CLASSIFICATION
CONFIDENTIAL
DRAWING NUMBER
FB299197
REV
SHEET
1 OF 2

Figure 5-65 Internal I/O Module Block Diagram

5-6-2 Internal I/O - Location in the Unit

The Internal I/O module is plugged into the Front-End Processor (Card Cage) at the end nearest to the rear of the system, see illustration below.


Internal I/O is located behind the cables at the rear of the Back-End Processor.
Internal I/O
Rear end of System
internal IO module seen from Back End Processor (BEP) side
A1
A2
A3 not used
A4
A5
A6
A7
A10
A11
A8
A9
+3.3V
+5V
+6V
+10V
+15V
+5V
+12V
-5V
-15V
From Back End
Connectors to/from Back End
B1
B2
B3
B4
B5
B6
B7
B8
B9
P31
P32
Connector to motherboard

Seen from right side of System

Seen from rear end of System

A1	BW printer video, BW printer remote control
A2	VCR remote control (RS232)
A3	Spare RS232 (future color printer control)
A4	Signals & power to/from top console
A5	Signals to/from top console
A6	Audio left out to VCR
A7	Audio right out to VCR
A8	Audio left reply from VCR
A9	Audio right reply from VCR
A10	SVideo out to VCR
A11	SVideo in from VCR

B1	USB#1 (top console conection)
B2	USB#2 (external i/o connection)
B3	10/100 Base-TX Ethernet
B4	Audio in to BEP, Audio out from BEP, Microphone in to BEP
B5	PC2IO board signals
B6	PC2IO board signals and power
B7	COM1
B8	COM2
B9	BEP Power Supply control (UPS)

Figure 5-66 Internal I/O - location in the unit

5-6-3 Input Signals to Internal I/O

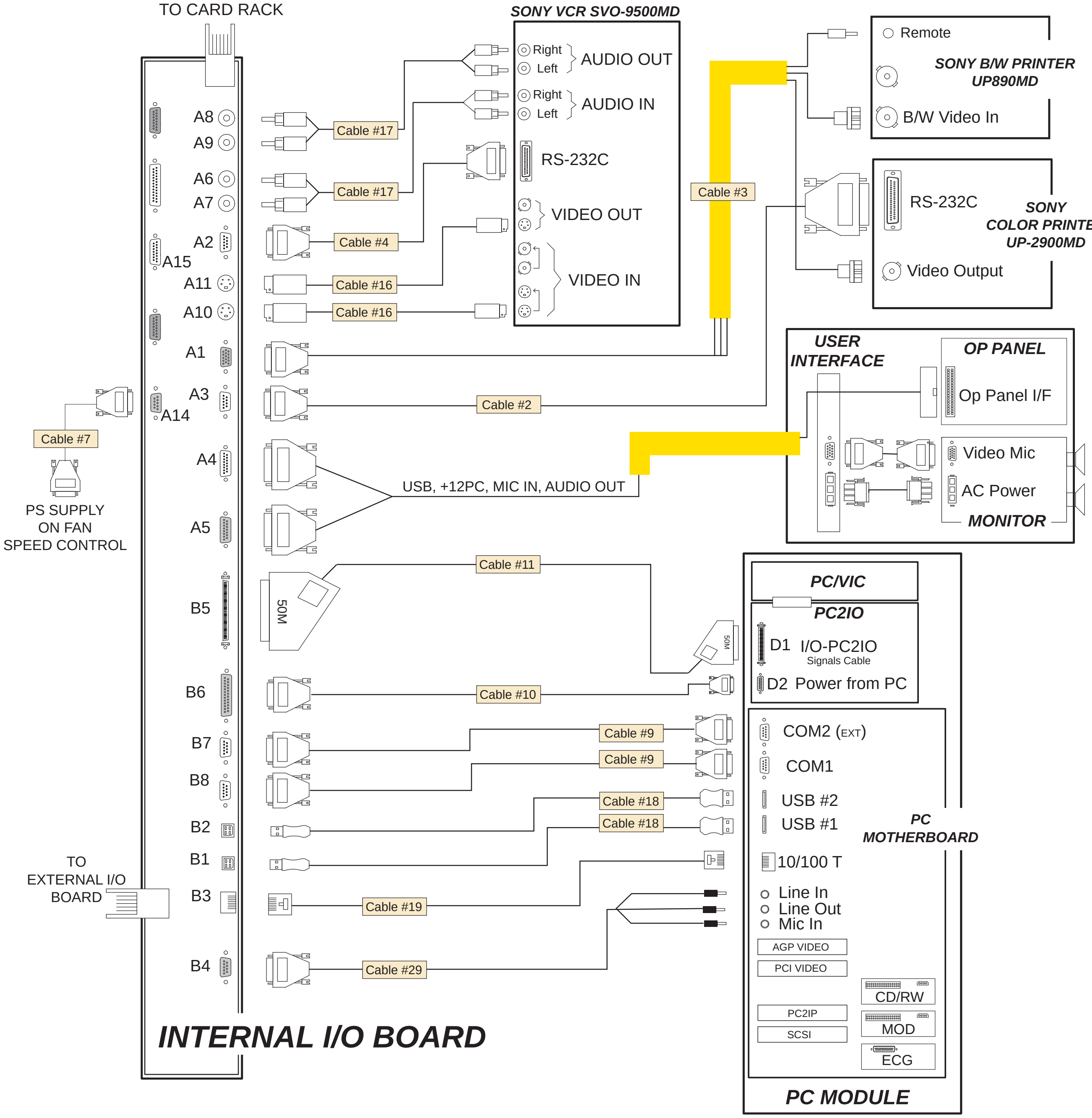

TO CARD RACK
SONY VCR SVO-9500MD
Right
Left
AUDIO OUT
Right
Left
AUDIO IN
RS-232C
VIDEO OUT
VIDEO IN
Remote
SONY B/W PRINTER
UP890MD
B/W Video In
RS-232C
SONY
COLOR PRINTER
UP-2900MD
Video Output
Cable #3
A8
A9
A6
A7
A2
A15
A11
A10
A1
A3
A14
A4
A5
B5
B6
B7
B8
B2
B1
B3
B4
Cable #17
Cable #17
Cable #4
Cable #16
Cable #16
Cable #2
Cable #7
PS SUPPLY
ON FAN
SPEED CONTROL
USB, +12PC, MIC IN, AUDIO OUT
USER
INTERFACE
OP PANEL
Op Panel I/F
Video Mic
AC Power
MONITOR
Cable #11
50M
50M
PC/VIC
PC2IO
D1 I/O-PC2IO
Signals Cable
D2 Power from PC
Cable #10
Cable #9
Cable #9
Cable #18
Cable #18
Cable #19
Cable #29
TO
EXTERNAL I/O
BOARD
COM2 (EXT)
COM1
USB #2
USB #1
PC
MOTHERBOARD
10/100 T
Line In
Line Out
Mic In
AGP VIDEO
PCI VIDEO
PC2IP
SCSI
CD/RW
MOD
ECG
INTERNAL I/O BOARD
PC MODULE

Figure 5-67 Internal I/O Module Connections

5-6-3 Input Signals to Internal I/O (cont'd)

5-6-3-1 DC Voltages

Table 5-69 DC Input Voltages

Input	Description	Connection from
+3.3 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+5 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+10 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+15 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
-15 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+6 VDC (analog)	Input DC Voltage	DC Power Supply > Backplane > J32
–5 VDC (analog)	Input DC Voltage	DC Power Supply > Backplane > J32
+5 VDC	Input DC Voltage	Back-End Processor > B6 (J17)
+12 VDC	Input DC Voltage	Back-End Processor > B6 (J17)

5-6-3-2 Video Input Signals

Table 5-70 Video Input Signals

Input	Description	Connection from
SVGA	Video Signal to External I/O	PC2IO B5 (J16)
SVHS	Video Signal to VCR & External I/O	PC2IO B5 (J16)
SVHS	Video Signal to MBD (IMP/RFI)	VCR A11 (J11)
Luma	Video Signal to B&W Printer and External I/O	PC2IO B5 (J16)
Comp. Video	Video Signal to External I/O	PC2IO B5 (J16)
Comp. Video	Video Signal to MBD (IMP/RFI)	Color printer

5-6-3 Input Signals to Internal I/O (cont'd)

5-6-3-3 Audio Input Signals

Table 5-71 Audio Input Signals

Input	Description	Connection from
Two channel audio	Audio signals, summed and distributed	IMP or RFI > MBD >
Two channel audio		VCR
Two channel audio		PC2IO (BEP)

5-6-3-4 Serial Ports

Table 5-72 Serial Ports on IIO in units with BEP1

Input	Description	Connection from
USB	Standard USB Serial Bus	BEP > Top console
USB	Standard USB Serial Bus	BEP > EIO
Ethernet	Standard 10/100 Ethernet	BEPM <-> EIO
RS232 - COM 1	Standard RS-232C Serial Bus	BEP COM1 > B8 (IIO) > EIO
RS232 - COM 2	Standard RS-232C Serial Bus	BEP COM2 > B7(IIO) > EIO

Table 5-73 Serial Ports on IIO in units with BEP2.x

Input	Description	Connection from
USB	Standard USB Serial Bus	BEP > Top console
USB	Standard USB Serial Bus	BEP > EIO
Ethernet	Standard 10/100 Ethernet	BEP <-> EIO
RS232	Standard RS232 Serial Bus	BEP COM1 > B8 (IIO) > EIO

5-6-3-5 Control Signals

Table 5-74 Control Signals

INPUT	DESCRIPTION	CONNECTION FROM
Control signals	Spare	FEC/RFI > MBD > IIO (NOT USED)
Control signals	Spare	FEC/RFI > MBD > IIO (NOT USED)
Trace trigger	To EIO	PC2IO B5 (J16)
Fan control signals	To AC Power	MBD > IIO > AC CONTROLLER
Power control signals	To MBD and AC Power	PC2IO B5 (J16)
Power on/off	To Relay	Top Console ON/OFF Switch and EIO Test B5 (J16)
Standby	To Top Console	PC2IO > IIO B5 (J16) > TOP CONSOLE

5-6-4 Output Signals from the Internal I/O

5-6-4-1 DC Voltage

Table 5-75 DC Output Voltages

Output	Description	Connection to
+5 VDC +12 VDC	From BEP	Spare (Connector J21)
+5 VDC, -15 VDC, -5 VDC $_{analog}$	From Card Cage	
+5 VDC +12 VDC	From BEP	Not Used
+5 VDC, -15 VDC, -5 VDC $_{analog}$	From Card Cage	
+5 VDC, +15 VDC,	From Card Cage	Not Used
+12 VDC	From PC2IO (BEP)	A4 > Top Console
+15 VDC	From Card Cage	
+5 VDC +12 VDC	From BEP	EIO
+5 VDC, +15 VDC, -5 VDC $_{analog}$ +6 VDC $_{analog}$	From Card Cage	

5-6-4-2 AUDIO

Table 5-76 Audio Outputs

Output	Description	Connection to
Audio (Left/Right)	Audio (Doppler Sound) from: - IMP or RFI > PCI-bus > PC2IP > Line Out > B4 (IIO) VCR Audio: - Audio OUT (L/R) > A8/A9 (IIO)	A5 > Top Console (speakers)
		B4 > Line In (BEP)
		A6/A7 > Audio IN (L/R) (VCR)
		EIO

5-6-4 Output Signals from the Internal I/O (cont'd)

5-6-4-3 Interface Connectors – "Back-End Processor Side"

Table 5-77 Connectors – "Back-End Processor side"

Input	Description	Connection from
A1/J1	B&W printer, 15pins HD-sub, female.	A1 > J1
A2/P4	VCR remote ctrl – RS232: 9pins D-sub, male.	
A3/P5	Color printer - RS232: 9pins D-sub, male.	
A4/J2	Top Console - Power & signals: 15pins D-sub, female.	
A5/P4	Top Console - Signals: 15pins D-sub, male.	
A6/J6	Audio out to VCR, left: Phono jack.	
A7/J7	Audio out to VCR, right: Phono jack.	
A8/J8	Audio in from VCR, left: Phono jack.	
A9/J9	Audio in from VCR, right	
A10/J10	SVHS out to VCR	
A11/J11	SVHS in from VCR	
B1/J12	USB to Top console	
B2/J13	USB to external I/O	
B3/J14	Ethernet	
B4/J15	Audio I/O	
B5/J16	PC2IO signals	
B6/J17	PC2IO power	
B7/P18	COM1	
B8/P19	COM2	
B9/P25	UPS remote control	
J32	MBD – signals and power	

5-6-4-4 Interface Connectors – "Front-End Processor Side"

Table 5-78 Connectors - "Front-End Processor side"

Input	Description	Connection from
A12/J21	Spare power, 15pins D-sub, female	
A13/J20	Spare – power, 15pins D-sub, female	
A14/J24	AC power ctrl, 9pins D-sub, female	
A15/P23	Rotation adapter – signals, 15 pins D-sub, male	
A16/P22	Spare – signals, 25pins D-sub, female	
P30	EIO – signals and power, 110pins male	

5-6-5 LEDs on Internal I/O

Light in nine green LEDs indicate that the respective DC Voltages are OK.

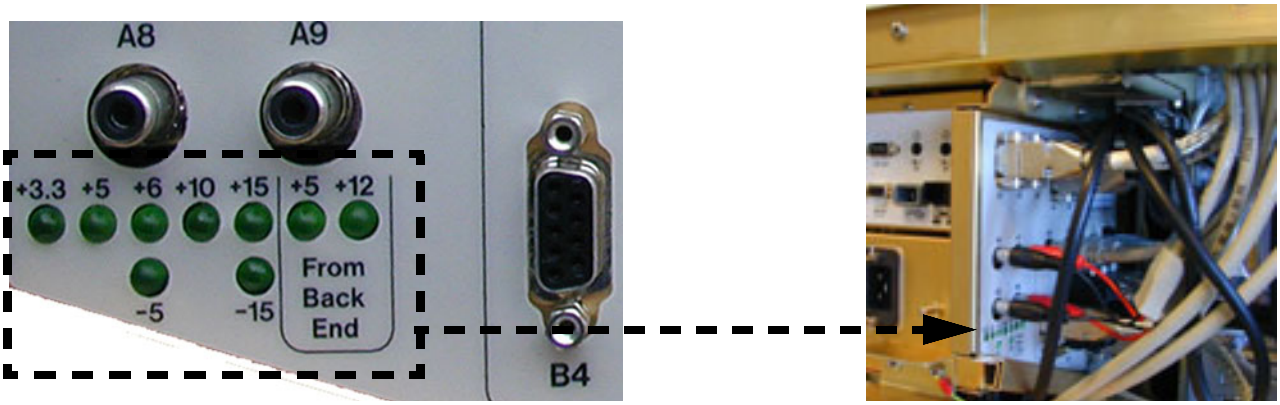

A8
A9
+3.3
+5
+6
+10
+15
+5
+12
-5
-15
From Back End
B4

Figure 5-68 Green LEDs for Power Status, located on Internal I/O

5-6-6 Fuses

All output voltages are fused.

5-6-7 Jumpers and Dip-switches

None

Section 5-7
Top Console with Monitor and Operator Panel

5-7-1 General Description

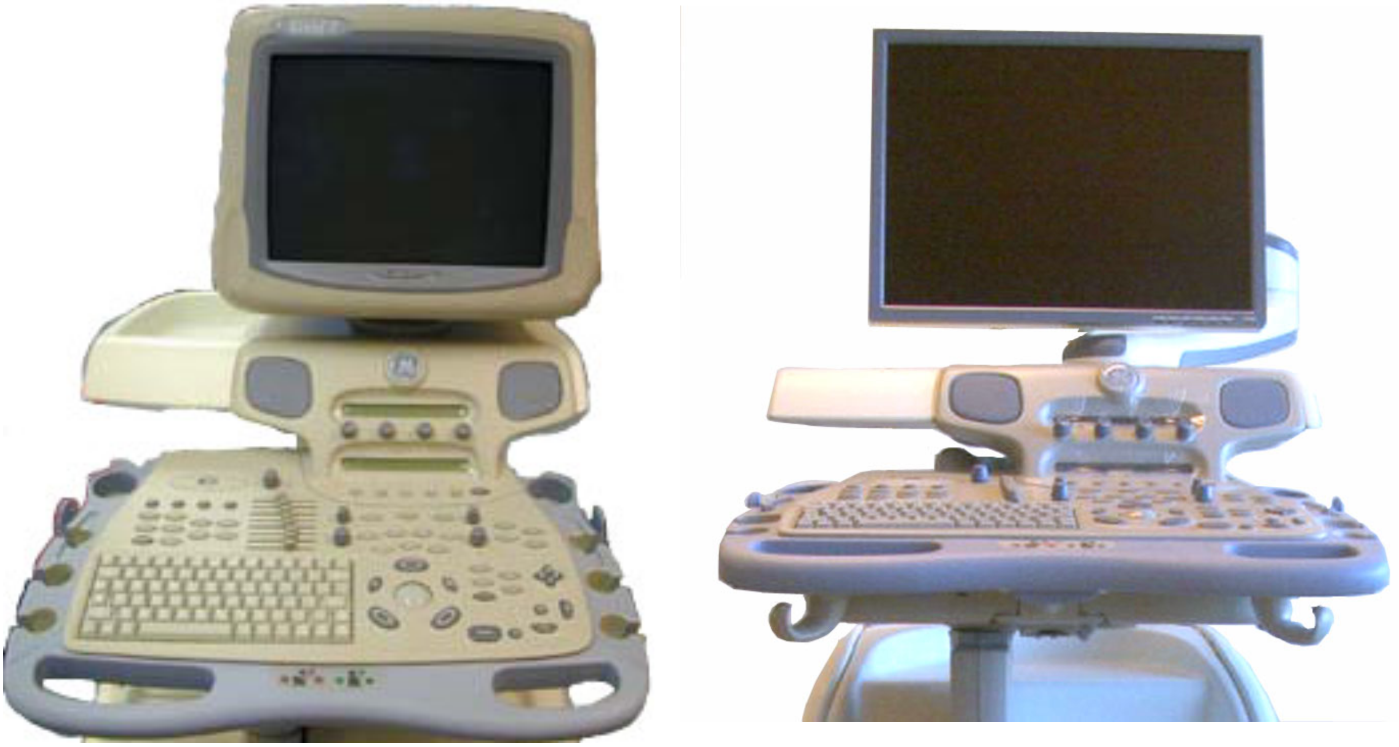


Figure 5-69 Top Console. CRT Monitor to the left, LCD Monitor (option) to the right

The Top Console includes:

- SVGA video monitor
  - CRT monitor (standard)
  - LCD monitor (option introduced for BT’06)
- Operator Panel with;
  - On/Off switch
  - Alphanumeric keyboard (QWERTY keyboard)
  - Controls for manipulating the picture quality and for use in Measure & Analyze (M&A)
- Speakers for stereo sound output (used during Doppler scanning/replay)

5-7-1 General Description (cont'd)

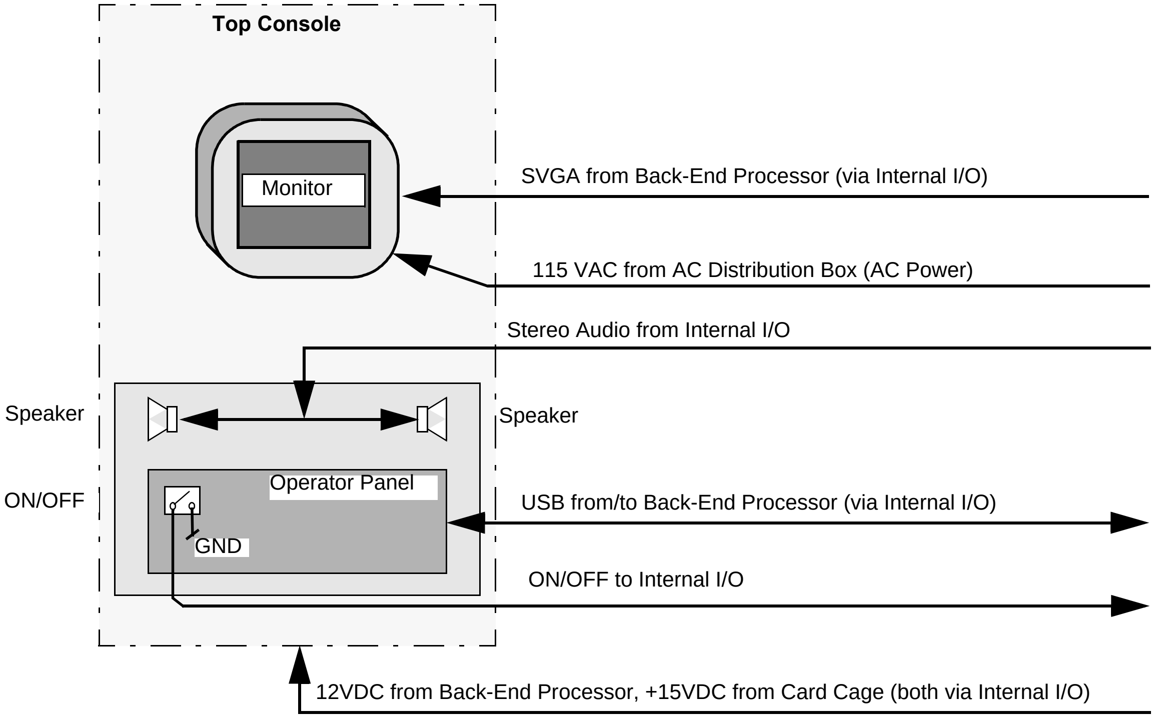

Top Console
Monitor
SVGA from Back-End Processor (via Internal I/O)
115 VAC from AC Distribution Box (AC Power)
Stereo Audio from Internal I/O
Speaker
Speaker
ON/OFF
Operator Panel
GND
USB from/to Back-End Processor (via Internal I/O)
ON/OFF to Internal I/O
12VDC from Back-End Processor, +15VDC from Card Cage (both via Internal I/O)

Figure 5-70 Top Console Block Diagram

5-7-2 Monitors

5-7-2-1 CRT Monitor

- 17-inch High Resolution Monitor with no interlace scan
- Available for all Vivid 7 models

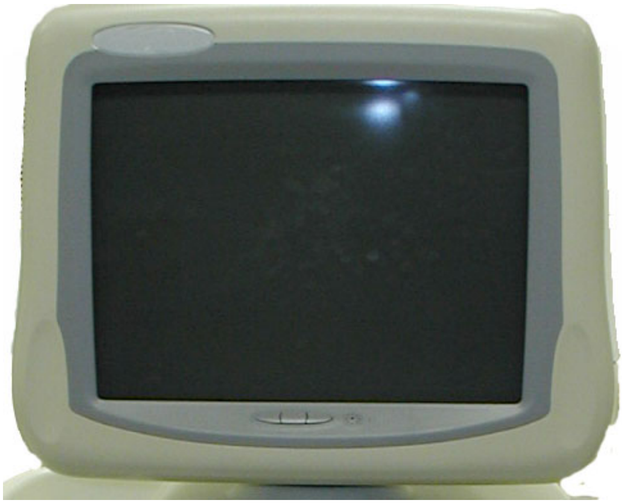


Figure 5-71 CRT Monitor

5-7-2-2 LCD Monitor (Option)

- 21-inch High Resolution Monitor with no interlace scan
- Mounted on the Monitor Arm so monitor can be moved left or right without moving the Vivid 7.
- Introduced for BT’06 (June 2006) as an option (Only available on order for new Vivid 7)

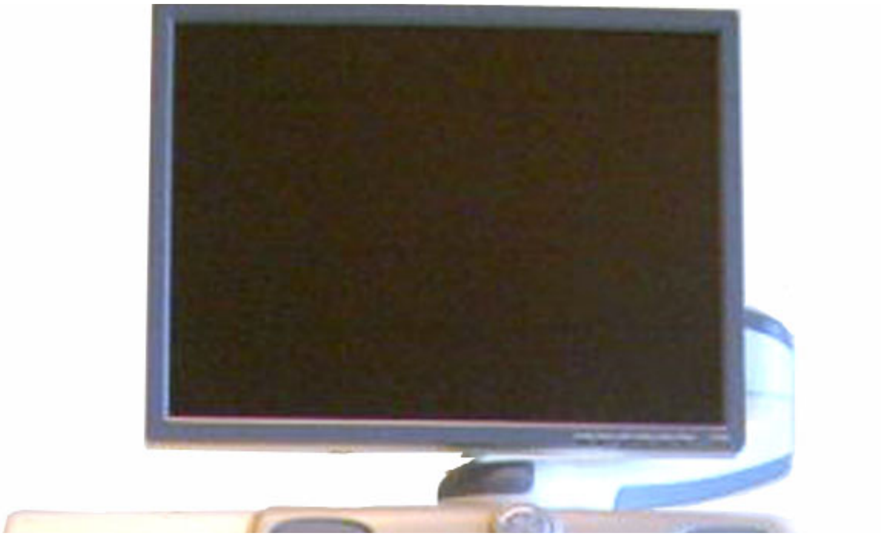


Figure 5-72 LCD Monitor

5-7-3 Operator Panel

The **Operator Panel** includes an ON/OFF switch, an alphanumeric keyboard, different controls for manipulating the picture quality, and controls for use in Measure & Analyze (M&A).

On units with software version 3.x.x (or above) the Rotaries have a “Push” function in addition to the ordinary rotary functions.

NOTE: Units originally produced with a software version below v3.0 need a hardware upgrade to activate the Push function. The needed hardware is included in the v3.x (Vantage) upgrade kit.

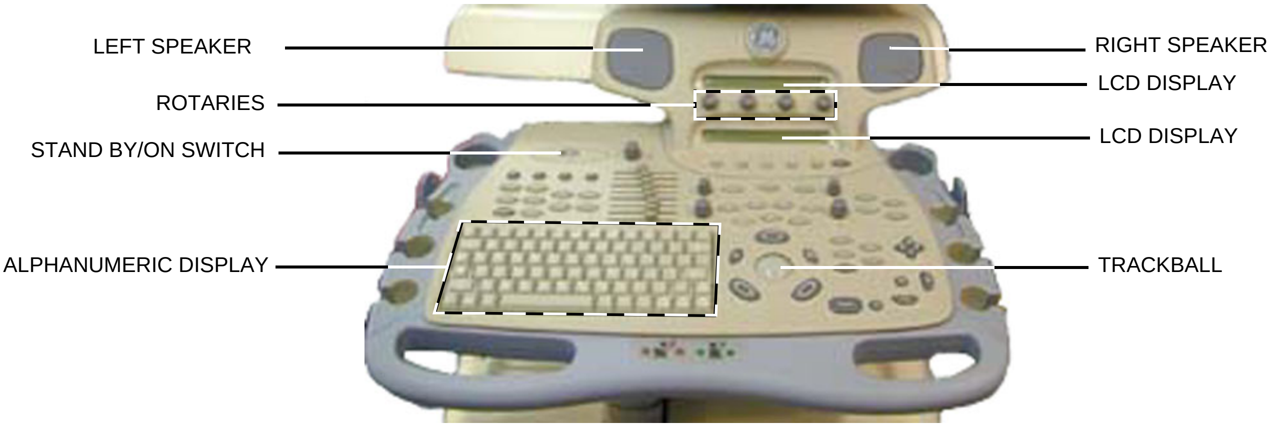

LEFT SPEAKER
ROTARIES
STAND BY/ON SWITCH
ALPHANUMERIC DISPLAY
RIGHT SPEAKER
LCD DISPLAY
LCD DISPLAY
TRACKBALL

Figure 5-73 Operator Panel

Section 5-8
External I/O

5-8-1 General Description, External I/O

The External I/O is the interface between the scanner and all external devices.

Several signal are fed from the Internal I/O module to the External I/O module. The External I/O module contains data buffers and a galvanic isolation section.

Different types of signals are fed to connectors accessible on the External I/O:

- R, G, B and Sync are provided for external RGB monitors or printers.
- Composite video, black and white video and S-VHS video are buffered and fed to output connectors for external monitors and printers.
- Two serial RS-232 ports are provided for external communication with e.g. the System CPU. One of the RS-232C ports are located inside the scanner, and was intended for use by a modem, the other is located on the EIO rear panel. These serial ports have never been used on Vivid 7.
- An Ethernet signal from the BEP is fed to an Ethernet connector. It is used for connectivity, including DICOM Network.

5-8-1 General Description, External I/O (cont'd)

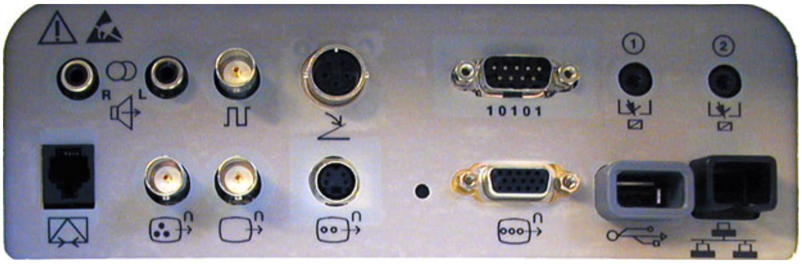


Figure 5-74 External I/O Connector Panel

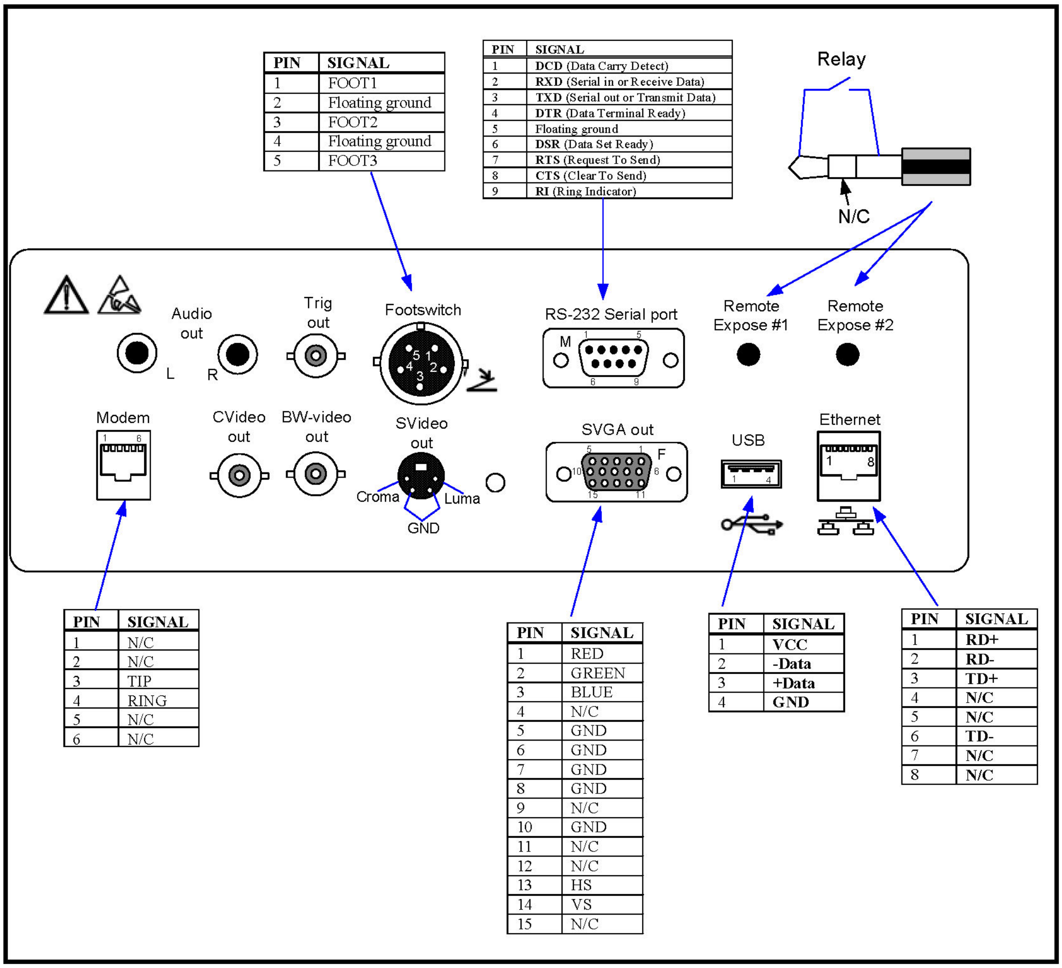
The External I/O has the following external connectors available at the rear of the system:

- Sound out (Right and Left channels - Stereo)
- Trig Out
- Footswitch
- RS-232 Serial Port (Not Used)
- Remote Expose 1
- Remote Expose 2
- Modem (Not Used)
- Composite Video Out
- B/W Video Out
- Svideo Out
- SVGA Out
- USB
- Ethernet

5-8-2 Location in the Unit

At the rear of the scanner, above the power inlet and power breaker.

5-8-3 Input Signals


Relay
N/C
Audio out
L
R
Trig out
Footswitch
5 1 4 2 3
RS-232 Serial port
M
1 5 6 9
Remote Expose #1
Remote Expose #2
Modem
1 6
CVideo out
BW-video out
SVideo out
Croma
Luma
GND
SVGA out
5 1 F 10 6 15 11
USB
1 4
Ethernet
1 8

Footswitch:

PIN	SIGNAL
1	FOOT1
2	Floating ground
3	FOOT2
4	Floating ground
5	FOOT3

RS-232 Serial port:

PIN	SIGNAL
1	**DCD** (Data Carry Detect)
2	**RXD** (Serial in or Receive Data)
3	**TXD** (Serial out or Transmit Data)
4	**DTR** (Data Terminal Ready)
5	Floating ground
6	**DSR** (Data Set Ready)
7	**RTS** (Request To Send)
8	**CTS** (Clear To Send)
9	**RI** (Ring Indicator)

Modem:

PIN	SIGNAL
1	N/C
2	N/C
3	TIP
4	RING
5	N/C
6	N/C

SVGA out:

PIN	SIGNAL
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	N/C
10	GND
11	N/C
12	N/C
13	HS
14	VS
15	N/C

USB:

PIN	SIGNAL
1	**VCC**
2	**-Data**
3	**+Data**
4	**GND**

Ethernet:

PIN	SIGNAL
1	**RD+**
2	**RD-**
3	**TD+**
4	**N/C**
5	**N/C**
6	**TD-**
7	**N/C**
8	**N/C**

Figure 5-75 EIO - Overview

Table 5-79 Input Signals

Input	Description	Connection from/via/to
Footswitch Connector	Footswitch is a mechanical switch that connect a signal to ground. Internal level is TTL (0-3.3V)	Footswitch > External I/O > Internal I/O > PC2IO (BEP)
	DC Voltages from BEP	
+5 VDC	Used for Optical Couplers on RS232 signals	PC2IO (BEP) > Internal I/O > External I/O
+12 VDC		
	DC Voltages from Card Cage	
+5 VDC	Used for Optical Couplers on Footswitch	Card Cage > Internal I/O > External I/O
+15 VDC		
-5 VDC $_{\text{analog}}$		
+6 VDC $_{\text{analog}}$		

5-8-4 Bi-directional Signals

Table 5-80 Bi-directional Signals

Signal Name	Description	Signal Path
Ethernet	Standard 10/100 Base TX Ethernet	Ethernet - External I/O - Internal I/O - BEP (Ethernet Connector)
COM1	Serial RS-232 port (Not used in Vivid 7)	External Device - External I/O - Internal I/O - BEP (COM1)
USB	Standard USB (Universal Serial Bus), (0-5V)	USB Device - External I/O - Internal I/O - BEP (USB #2))
Modem (option)	Internal Modem Telephone Line Connection	Analog Phone Line - External I/O (Connector Panel) - External I/O (Rear Side)- Modem
COM2	Serial RS-232 port (on rear side of External I/O)	Modem - External I/O (Rear Side) - Internal I/O - BEP (COM1)
Burn-in Power On/Off Control	Burn-in Power On/Off Control (on rear side of External I/O) - Used for factory testing.	External I/O (Rear Side) - Internal I/O

5-8-5 Output Signals

Table 5-81 Output Signals

Signal Name	Description	Signal Path
Stereo Audio	Stereo audio to external VCR. (Same signal as delivered to internal VCR).	Audio Source (Internal VCR/ Microphone/BEP) > Internal I/O > External I/O > External VCR.
Composite Video	External composite video, 1.0Vp-p, 75 ohms, unbalanced, sync negative.	PC2IO (BEP) > Internal I/O > External I/O > External Composite Video Device
Super Video (SVHS)	Super Video Luminance: 1.0Vp-p, 75 ohms, unbalanced. Color: 1.0Vp-p, 75 ohms, unbalanced.	PC2IO (BEP) > Internal I/O > External I/O > External VCR
Black and White video	External black and white video 1.0Vp-p, 75 ohms, unbalanced, sync negative.	PC2IO (BEP) > Internal I/O > External I/O > External B/W Video Device
Trig out	ECG Trigger Signal, 0-3.3V	
SVGA	SVGA (RGBS) high resolution video output (Same signal as sent to the systems monitor)	PCVIC > PC2IO (BEP) > Internal I/O > External I/O > External Monitor
Remote Expose #1	A SW controllable relay, to control external peripherals	PC2IO (BEP) > Internal I/O > External I/O > External Peripheral
Remote Expose #2	A SW controllable relay, to control external peripherals	PC2IO (BEP) > Internal I/O > External I/O > External Peripheral

5-8-6 Reset Switch

A reset switch is located behind the little hole on the External I/O.

NOTE: Use this Reset Key if told so by procedure in this manual or by OLC, ONLY.

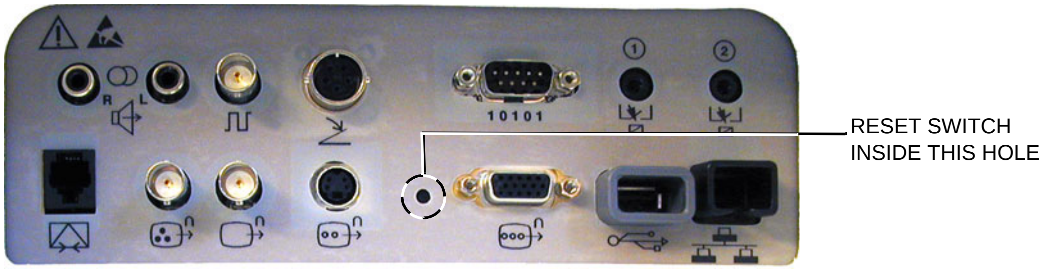


Figure 5-76 External I/O Connector Panel with Reset Switch hole

5-8-7 Jumpers and Dip-switches

None

5-8-8 LEDs

None

5-8-9 Video Specifications

5-8-9-1 PAL Video Specifications

Table 5-82 PAL Video Specifications

HORIZONTAL TIMING		
Horizontal Total (HT)	64 µs	944 pixels
Horizontal Start (HS)	10.3051 µs	152 pixels
Horizontal Active (HA)	52 µs	768 pixels
Pixel Clock Freq.	14.7 MHz	(PAL)
VERTICAL TIMING (INTERLACED)		
Vertical Start (VS)	53 Lines / field	
Active Lines (VA)	576 Lines / frame	(=PAL standard)
Total Lines (VT)	625 Lines / frame	(=PAL standard)
Frame Rate	25 Hz	(=PAL standard)

5-8-9-2 NTSC Video Specifications

Table 5-83 NTSC Video Specifications

HORIZONTAL TIMING		
Horizontal Total (HT)	63.556 µs	780 pixels
Horizontal Start (HS)	9.6149 µs	118 pixels
Horizontal Active (HA)	52.6555 µs	640 pixels
Pixel Clock Freq.	12.272725 MHz	(NTSC)
VERTICAL TIMING (INTERLACED)		
Vertical Start (VS)	17 Lines / field	
Active Lines (VA)	486 Lines / frame	(=NTSC standard)
Total Lines (VT)	525 Lines / frame	(=NTSC standard)
Frame Rate	29.97 Hz	(=NTSC standard)

5-8-9-3 SVGA

Table 5-84 SVGA Video Specifications

STANDARD	FORMAT	SIGNAL	SYNC	DDC	TERMINATION
SVGA	800 x 600 / 75 Hz	RGB: 0-700 mV	H: TTL V: TTL	VESA DDC2 signals	75 ohms

Section 5-9
Peripherals

5-9-1 Internal Peripherals

- DVD R/W (BT'04 and newer) available from the front of the BEP and the scanner.

NOTE: ***Only*** *CD-R and DVD-R (write once and read many) is supported. CD-R/W and DVD R/W discs are not supported.*

- CD R/W drive (BT'01, BT'02 and BT'03)

NOTE: ***Only*** *CD-R (write once and read many) is supported. CD-R/W discs are not supported.*

- DVD Recorder (DVR) (connected to Internal I/O) Introduced for BT'06, software v6.0.
- VCR (connected to Internal I/O)
- MO-Drive (option) available from the front of the BEP and the scanner.

NOTE: *Vivid 7 with software version v2.2.5 and below supports MO disks up to 8.6 GBytes. Support for 9.1 GBytes disks was introduced in software version v2.3.0.*

- Black & White Graphic Printer (connected to Internal I/O (analog video) or BEP (digital printer))
- Color Video Printer (connected to BEP)
- A modem (option) (connected internally to External I/O) was included with Vivid 7 with BEP1. It has never been used.

For a list of all peripherals approved by the manufacturer, please refer to: 3-7-3-1 "Approved Internal Peripherals" on page 3-36

5-9-2 External Peripherals

(See 3-7-3-2 "External Peripherals (Optional)" on page 3-37)

- Color Inkjet Printer
- Footswitch, Phone Line (option) and Ethernet are connected to the External I/O
- USB Flash Card (option)

  Support for USB Flash Card was introduced in software version v4.0.

NOTE: *USB Flash Cards approved for Vivid 7 are verified for EMC performance according to EN55011 class B. The use of any other USB Flash Cards will compromise this verification, and may cause interference on Vivid 7 itself, or on other electronic devices. For approved models, see: Table 9-54 "USB Flash Card (USB Drive)" on page 9-67.*

Install the USB Flash Card in (one of) the USB port(s) on the front of Vivid 7.

- Vivid 7 with BEP4.x has one USB 2.0 port on the front.
- Vivid 7 with BEP3.x has two USB 2.0 ports on the front.

The port at the rear of the system is USB 1.1, and is not approved for use with the USB Flash Card.

Section 5-10
Modem (Option)

NOTE: The modem has almost never been in active use.

5-10-1 General Description

The modem is a standard MultiTech modem that connects to an analog phone line. It is used when connecting to GE via iLink and for InSite Remote Service.

The modem is included on all units produced before February 2003. On units produced after February 2003, the modem is optional.

5-10-2 Location in the Unit

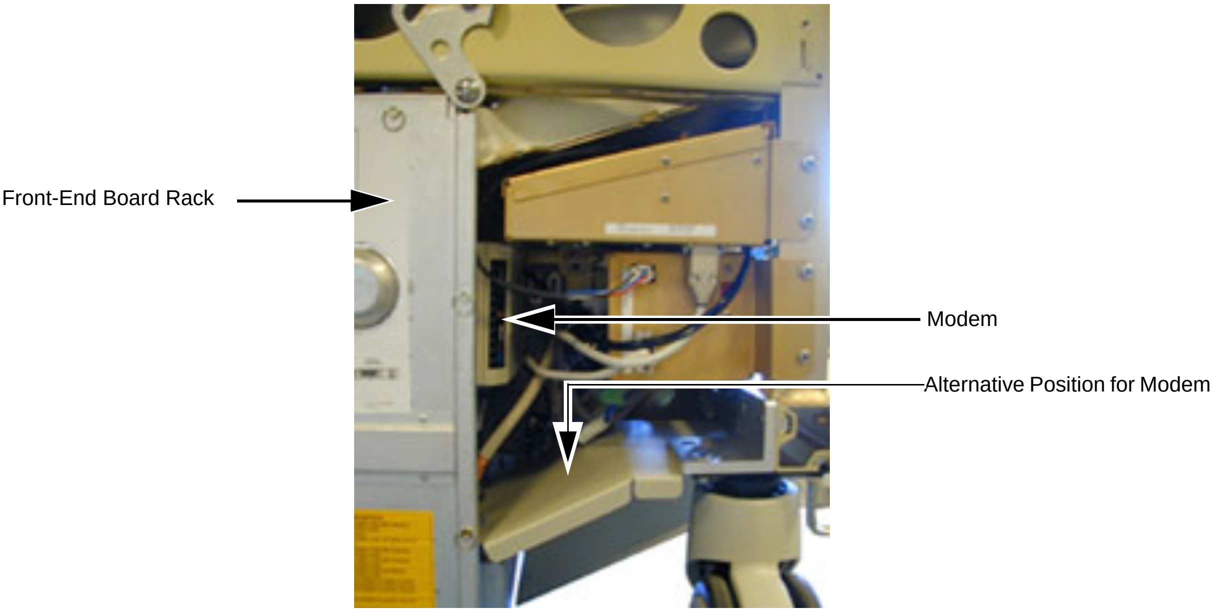


Figure 5-77 Modem: Location in Unit

5-10-3 Modem (Option) Inputs/Outputs

- DC Voltage from Modem Power (AC/DC Converter)
- RS232 from Back-End Processor via Internal I/O and External I/O
- Analog Phone line via External I/O

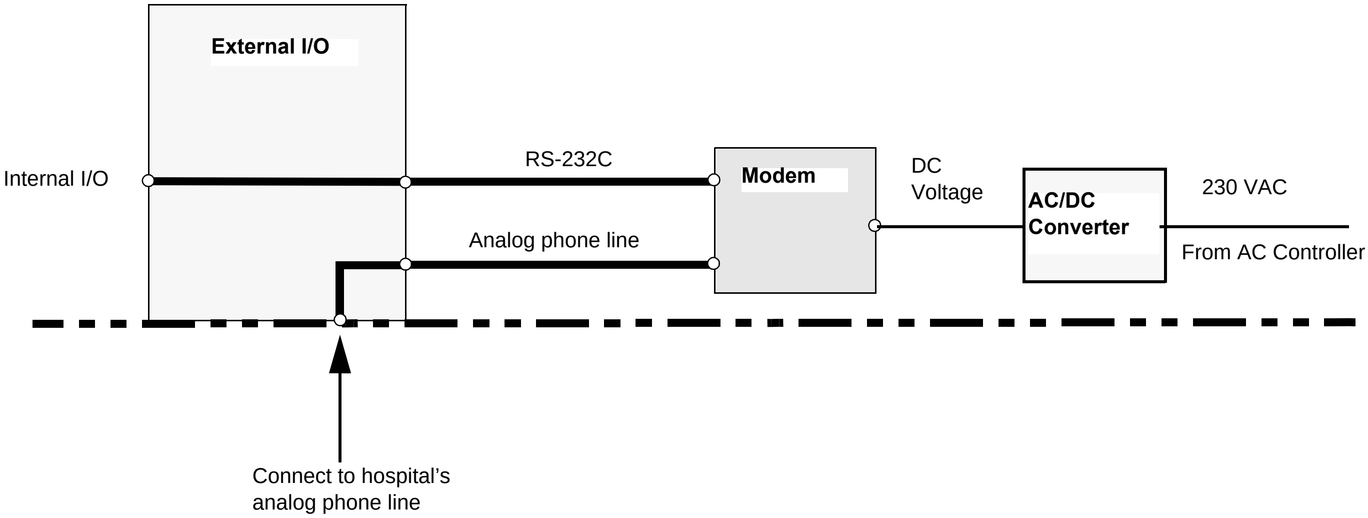

External I/O
Internal I/O
RS-232C
Modem
DC
Voltage
AC/DC
Converter
230 VAC
From AC Controller
Analog phone line
Connect to hospital's
analog phone line

Figure 5-78 Modem Option Block Diagram

5-10-4 Fuses

None

5-10-5 Jumpers and Dip-switches

None

5-10-6 LEDs on Modem

The Modem has ten LEDs on its front.

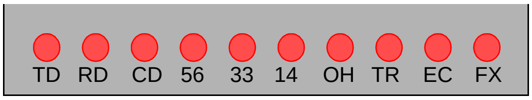


Figure 5-79 LEDs on Modem's Front Panel

Table 5-85 LEDs on Modem

LED COLOR	DESCRIPTION	NORMAL STATE
🟥 - Red	TD (Transmit Data)	Flashes during use.
🟥 - Red	RD (Receive Data)	Flashes during use.
🟥 - Red	CD (Carrier Detect)	ON when detecting a carrier from another modem and during communication. OFF indicates no or broken connection.
🟥 - Red	56 (56K Mode)	During Power On: Briefly Flashing These LEDs indicates communication speeds above 14 kbs. If one of this LEDs are ON during communication, it will stay ON until the modem is reset or connected the next time. At speeds below 14 kbs, these LEDs are OFF.
🟥 - Red	33 (V.34 Mode)	
🟥 - Red	14 (V.32bis Mode)	
🟥 - Red	OH (Off hook)	ON when dialing, online, or answering a call Flashes if pulse dialing Off when modem not in use
🟥 - Red	TR (Terminal Ready)	ON when the system initializes the modem. It indicates that the modem is ready for an outgoing or incoming call. OFF indicates that communication on the RS232 (COM) port has been broken. The connected (remote) modem will disconnect.
🟥 - Red	EC (Error Correction (V.42))	ON: Error Correction (V42) is turned ON Blinking: Compression turned ON OFF: Normal operation.
🟥 - Red	FX (Fax)	Always OFF

Section 5-11
Power Distribution

5-11-1 Overall AC Power Distribution

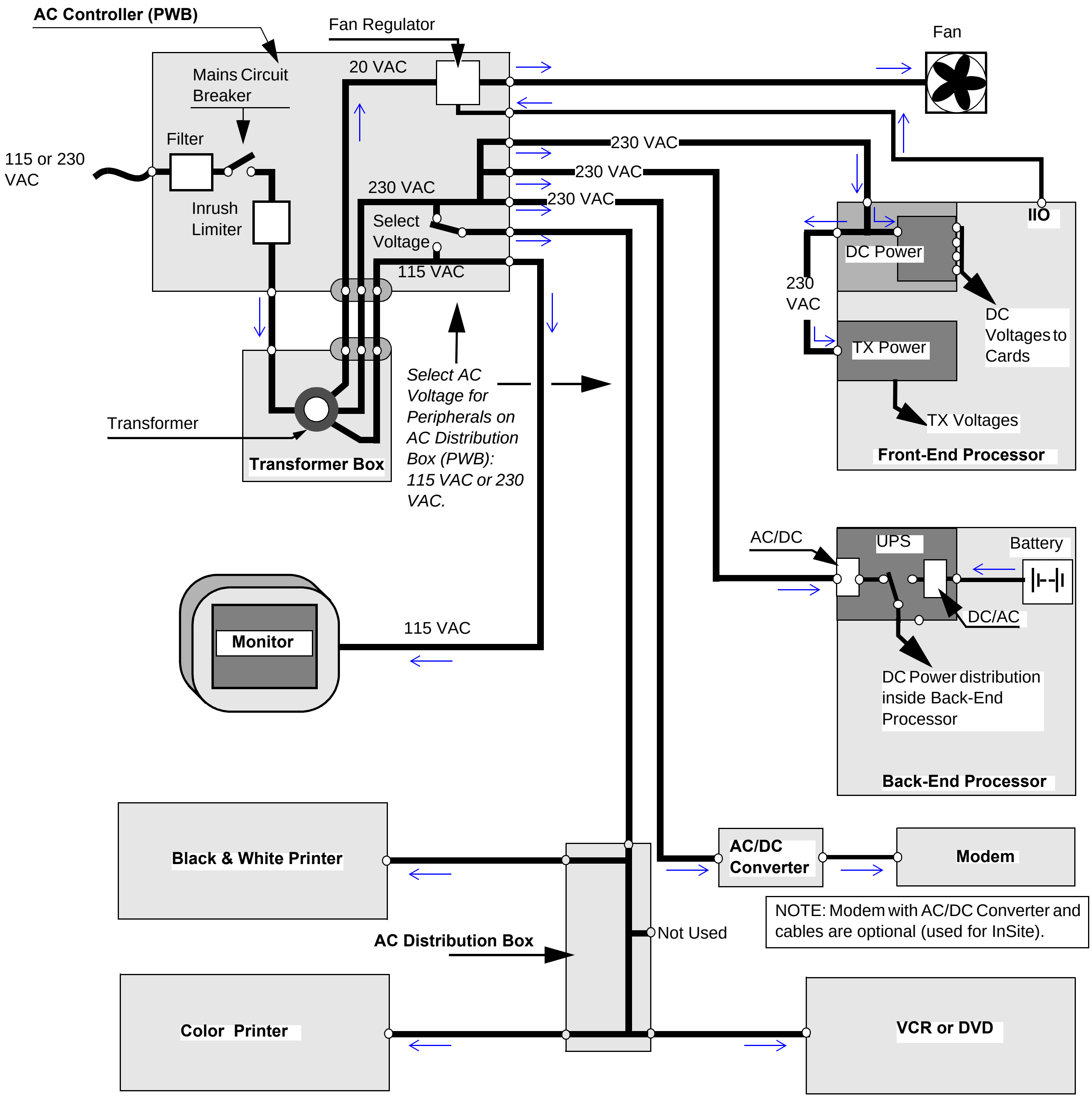

AC Controller (PWB)
Fan Regulator
Fan
Mains Circuit Breaker
20 VAC
Filter
115 or 230 VAC
Inrush Limiter
230 VAC
230 VAC
230 VAC
230 VAC
Select Voltage
115 VAC
IIO
DC Power
230 VAC
DC Voltages to Cards
TX Power
TX Voltages
Front-End Processor
Transformer
Transformer Box
Select AC Voltage for Peripherals on AC Distribution Box (PWB): 115 VAC or 230 VAC.
AC/DC
UPS
Battery
DC/AC
DC Power distribution inside Back-End Processor
Back-End Processor
Monitor
115 VAC
Black & White Printer
AC/DC Converter
Modem
NOTE: Modem with AC/DC Converter and cables are optional (used for InSite).
Not Used
AC Distribution Box
Color Printer
VCR or DVD

Figure 5-80 Overall Power Distribution

5-11-1 Overall AC Power Distribution (cont'd)

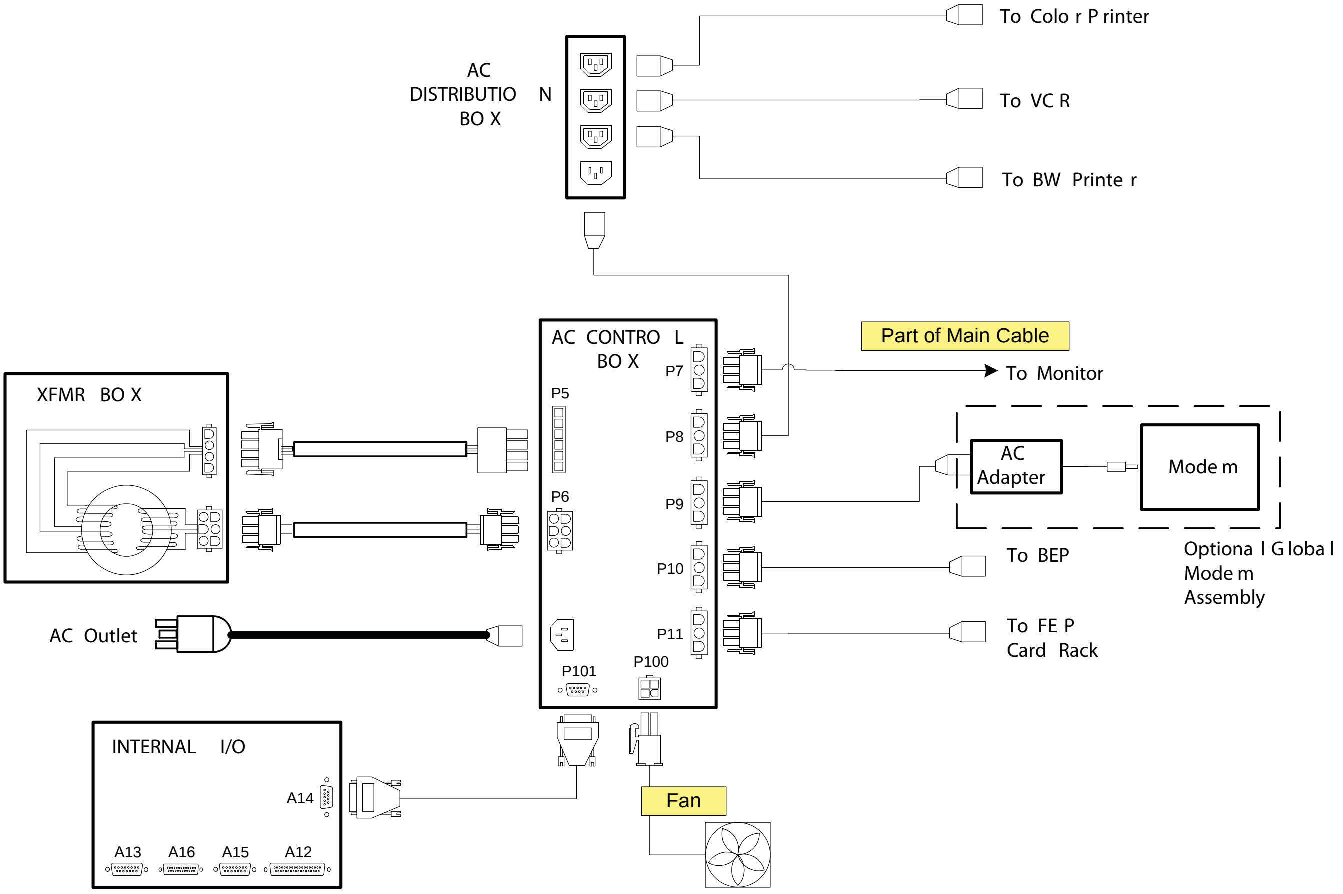

To Color Printer
AC DISTRIBUTION BOX
To VCR
To BW Printer
AC CONTROL BOX
Part of Main Cable
P7
To Monitor
XFMR BOX
P5
P8
AC Adapter
Modem
P9
P6
P10
To BEP
Optional Global Modem Assembly
AC Outlet
P11
To FEP Card Rack
P100
P101
INTERNAL I/O
A14
Fan
A13
A16
A15
A12

Figure 5-81 AC Cables

5-11-2 AC Controller

5-11-2-1 General Description of the AC Controller

The AC Controller’s main task is to supply the various internal subsystems with AC power and to galvanically isolate the scanner from the on-site Mains Power System.

An inrush current limiter reduce the peek input current when the unit is switched on. An EMI filter helps to reduce EMI to acceptable levels.

The voltage to peripherals can be configured to either 115 VAC or 230 VAC. The AC Power also controls and supplies the 20VAC needed by the systems cooling fan.

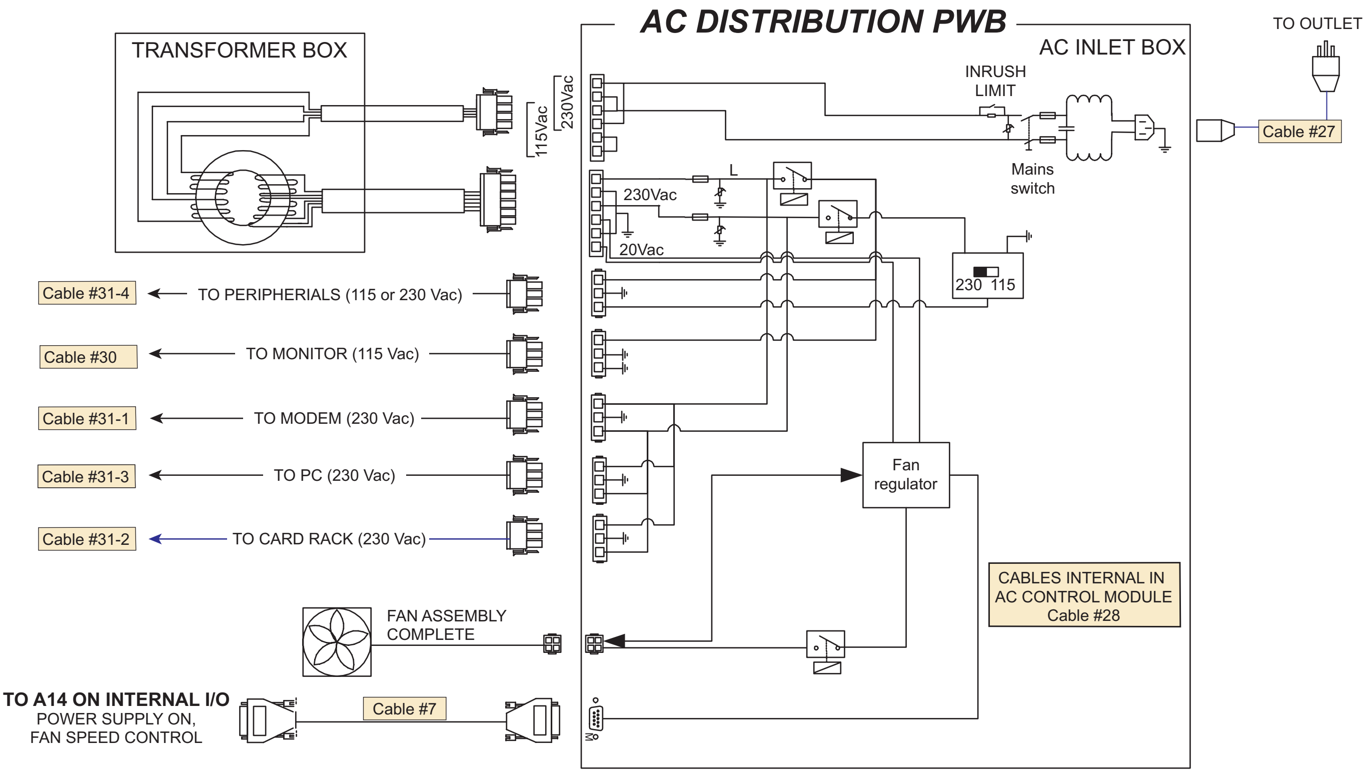

AC DISTRIBUTION PWB
TRANSFORMER BOX
AC INLET BOX
TO OUTLET
INRUSH LIMIT
Mains switch
Cable #27
115Vac
230Vac
230Vac
20Vac
L
230 115
Cable #31-4
TO PERIPHERIALS (115 or 230 Vac)
Cable #30
TO MONITOR (115 Vac)
Cable #31-1
TO MODEM (230 Vac)
Cable #31-3
TO PC (230 Vac)
Cable #31-2
TO CARD RACK (230 Vac)
Fan regulator
CABLES INTERNAL IN AC CONTROL MODULE Cable #28
FAN ASSEMBLY COMPLETE
TO A14 ON INTERNAL I/O
POWER SUPPLY ON,
FAN SPEED CONTROL
Cable #7

Figure 5-82 AC Power Distribution

The mains cord has plugs in both ends. A female plug connects to the scanner and a male plug to the wall mains outlet.

The mains voltage is routed from the mains power inlet at the rear of the system via an EMI filter to the Mains Circuit Breaker, also located at the rear of the system. From the Mains Circuit Breaker, the AC power is routed via an Inrush Current Limiter (titled: Inrush Limiter in Figure 5-82) to an internal outlet connector for the AC Transformer.

The Mains Circuit Breaker is of the auto fuse type. If for some reason the current grows to high, the switch will automatically break the power.

5-11-2-2 The AC Transformer

The AC Transformer is the galvanic barrier between the rest of the scanner and the on-site AC Mains.

Input voltage to the transformer can be either 230 VAC or 115 VAC. The transformer has two 115 VAC primary windings which are series- or parallel coupled depending on input voltage (see Figure 5-83).

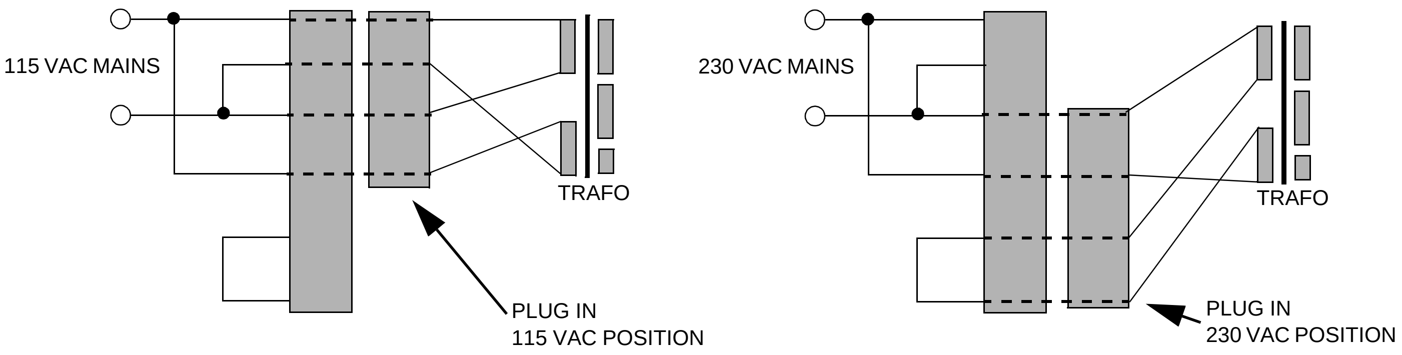


Figure 5-83 115VAC/230VAC Input Voltage Selection

Each of the primary windings has one thermal protection device in series with the windings, which will open if internal temperature exceeds 125 ^{o}C.

The plug on the cable to the AC Transformer is positioned different for the two AC Mains voltages, see Figure 5-84 "Connector Pin-out - AC Connectors on AC Controller" on page 5-131.

The secondary side of the transformer has two 115 VAC windings and one 20 VAC winding. The two 115 VAC windings are connected in series to produce 230 VAC, so the following voltages are available on the plug from the AC Transformer:

- 230 VAC
- 115 VAC
- 20 VAC

5-11-2-3 Distribution of Voltages via AC Controller

The 20 VAC is routed via the fan regulator to the system fan.

Both 115 VAC and 230 VAC are routed via fuses.

- 115 VAC is routed to the Monitor outlet (MONITOR)
- An AC Voltage selector is used to select the correct voltage for the Peripherals. The selected voltage (230 VAC or 115 VAC) is routed to the Peripherals AC outlet (PERIPH'S)
- 230 VAC is distributed to;
  - Modem AC outlet (MODEM)
  - Back-End Processor AC outlet (PC)
  - Front End Card Cage AC outlet (RACK)

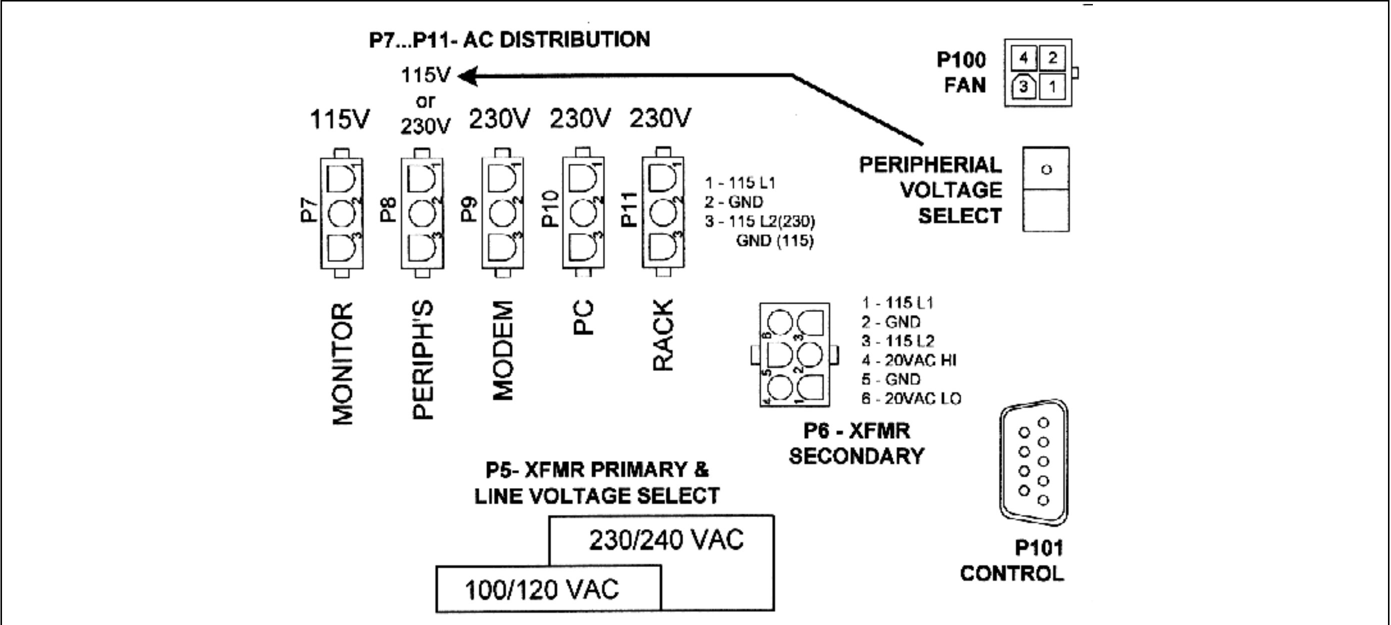

P7...P11- AC DISTRIBUTION
115V or 230V
115V
230V
230V
230V
P7
P8
P9
P10
P11
1 - 115 L1
2 - GND
3 - 115 L2(230)
GND (115)
MONITOR
PERIPH'S
MODEM
PC
RACK
P100
FAN
4
2
3
1
PERIPHERIAL
VOLTAGE
SELECT
1 - 115 L1
2 - GND
3 - 115 L2
4 - 20VAC HI
5 - GND
6 - 20VAC LO
P6 - XFMR
SECONDARY
P5- XFMR PRIMARY &
LINE VOLTAGE SELECT
230/240 VAC
100/120 VAC
P101
CONTROL

Figure 5-84 Connector Pin-out - AC Connectors on AC Controller

5-11-2-4 Location in the Unit - AC Controller and AC Transformer

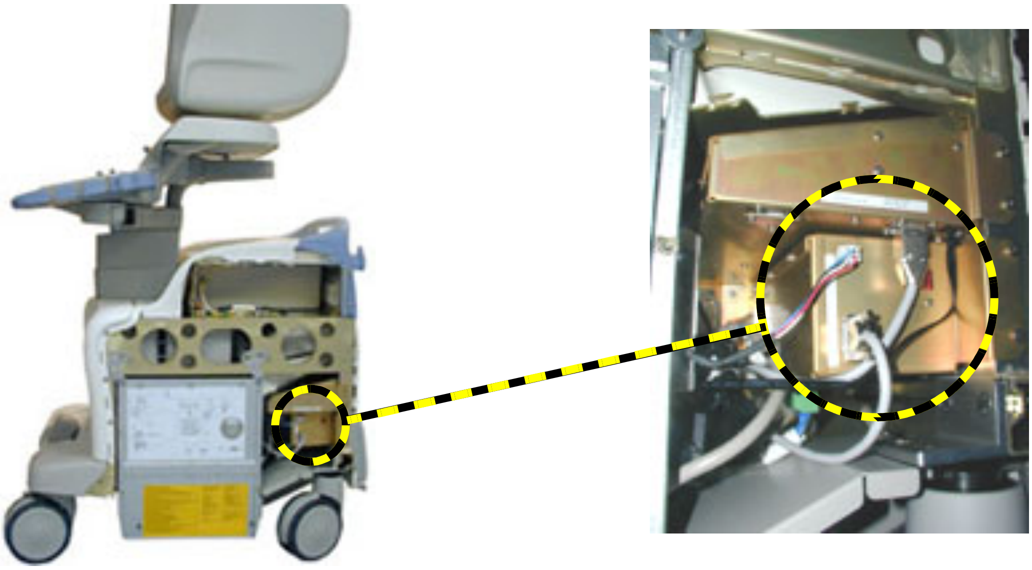


Figure 5-85 AC Controller

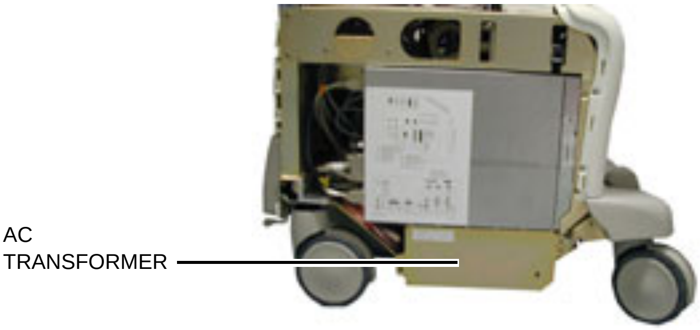


Figure 5-86 AC Transformer

5-11-3 DC Power

5-11-3-1 General Description

- The DC Power module is a switch mode power supply, enclosed in a metal frame that slides into the Card Cage.
- The module connects to the Motherboard (Backplane) through two F48 pin male connectors (P3 and P4) and supplies DC voltage via the Backplane, to all the boards in the Front End Card Cage (FEP), to the I/O and to the Operator Panel.

5-11-3-2 Location in the Unit

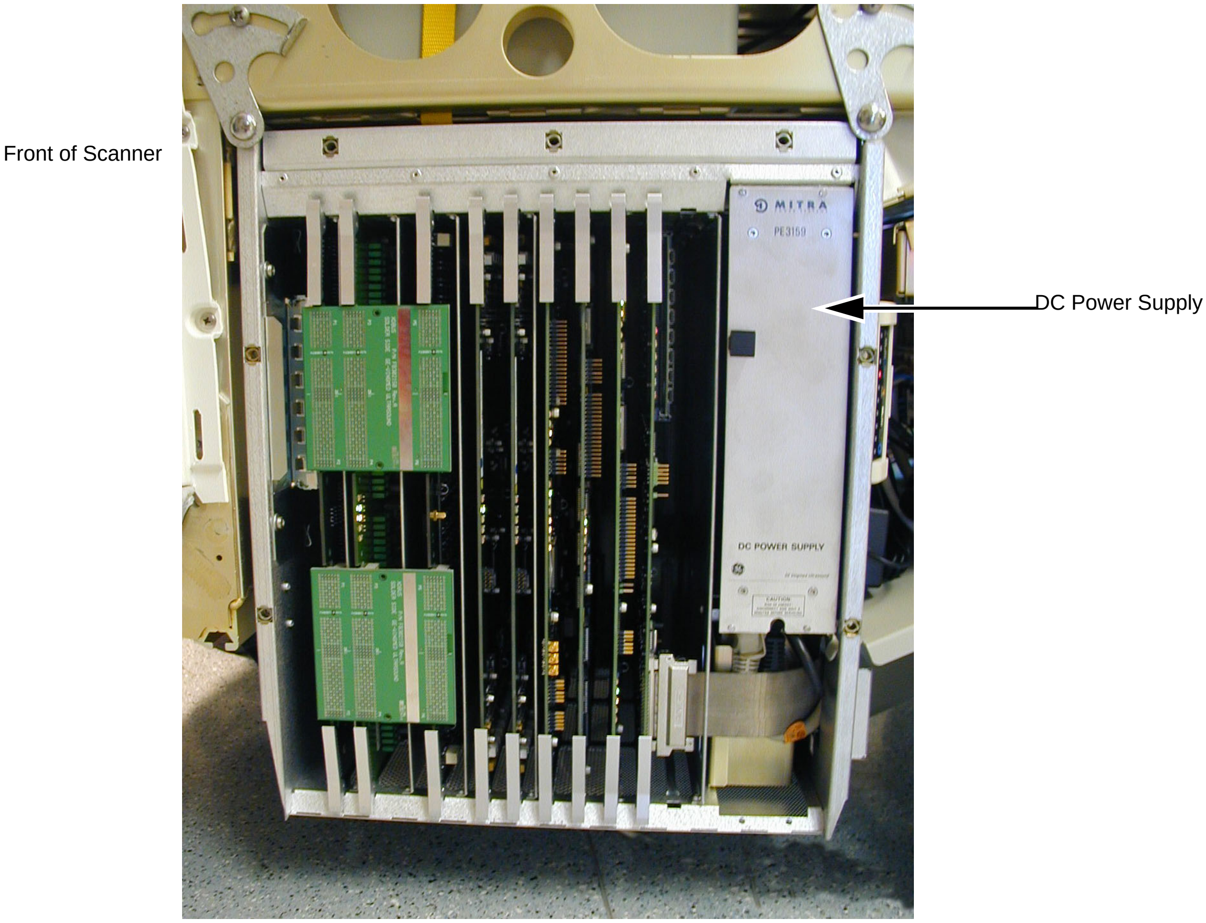


Figure 5-87 DC Power - Location in the Unit

5-11-3-3 Inputs

AC Voltage. Plug P1, 230 VAC

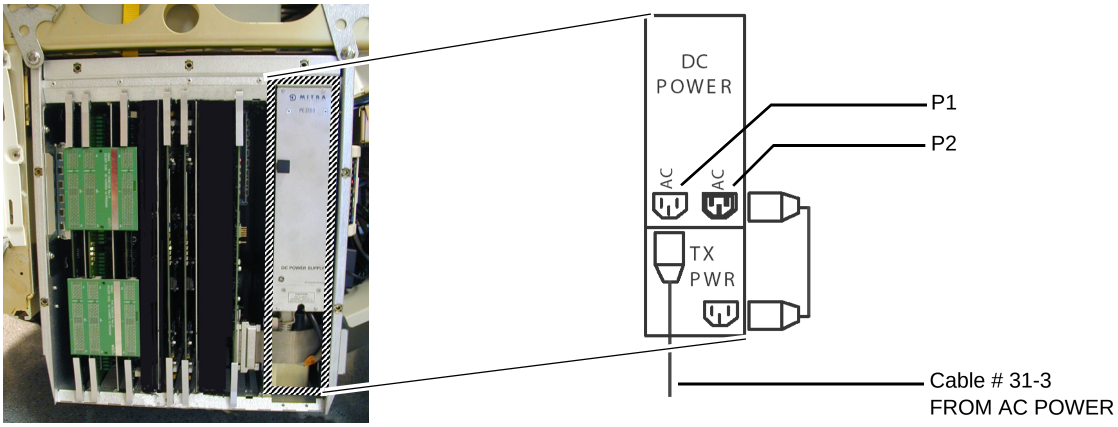


Figure 5-88 AC Voltage input to DC Power module

Table 5-86 Input, Plug P1, 230 VAC

INPUT	DESCRIPTION	CONNECTION FROM:
230 VAC	AC Input via a three pin male (IEC) mains inlet	Cable from the AC Power Distribution Box

Table 5-87 Sense and Control Signals, Plug P3 and P4

INPUT/OUTPUT	DESCRIPTION	CONNECTION FROM/TO:
+ 3.3 Sense	Remote sense	+3.3 V from Motherboard
- 3.3 Sense	Remote sense	-3.3 V from Motherboard
PS_ON*	Active low control signal used to turn the DC Power ON. Controls the AC Power output to TX Power.	From: ON/OFF (Standby) key on Operator Panel
SYNC.	Not used	*FEP1:* FEC *FEP2:* RFI
PWR_OK	Control signal. Is high when the DC voltages are within specification. Is low when power is on its way ON or OFF. Used for control of AC Power output to TX Power.	

5-11-3-4 Outputs

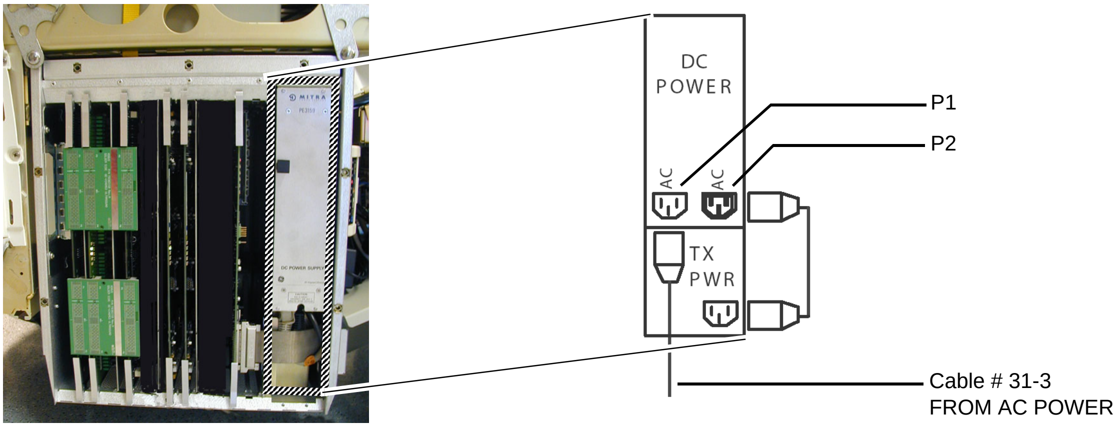


Figure 5-89 AC Voltage from DC Power module (to TX Power)

Table 5-88 AC Voltage Output, Plug P2, 230 VAC

OUTPUT	DESCRIPTION	CONNECTED TO
230 VAC	AC output via a three pin female (IEC) mains plug on cable. This power is output enabled by use of a relay. It is controlled by PS_ON* (active low) and PWR_OK (high)	TX Power

Table 5-89 DC Output Voltages, Plug P3 & P4

OUTPUT	DESCRIPTION	CONNECTED TO FEP1	CONNECTED TO FEP2
+ 3.3 V	DC output voltages, distributed via Motherboard (Backplane)	BF64 (two boards)	BF64 (two boards)
+ 5 Vd	DC output voltage, distributed via Motherboard (Backplane). The “d” indicates that this voltage is used for digital circuits.	BF64 (two boards) FEC, RFT, SDP, IMP2 Operator Panel I/O	BF64 (two boards) RFI Operator Panel I/O
+ 6 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits	Relay TX RX	Relay TX RX
- 5 Va	DC output voltage, distributed via Motherboard (Backplane). The “a” indicates that this voltage is used for analog circuits.	Relay, RX, BF64 (two boards) FEC, RFT, SDP, IMP2	Relay RX BF64 (two boards) RFI
+5Vstb	Standby voltage		
+10 V	DC output voltage, distributed via Motherboard (Backplane)	TX	TX
+15 V	DC output voltage, distributed via Motherboard (Backplane)	Relay, RX, Operator Panel, I/O	Relay, RX, Operator Panel, I/O
- 15 V	DC output voltage, distributed via Motherboard (Backplane)	RX, Operator Panel, I/O	RX, Operator Panel, I/O
GND	Distributed via Motherboard (Backplane)	All boards	All boards

5-11-3-5 Fuses

- None.
- A current limiter will switch off the power if + 3.3 V, +5 V or +15 V outputs are overloaded
- Over-voltage Protection is provided for these voltages:
  - + 3.3 V
  - + 5 Vd
  - +/- 5 Va
  - +/- 15 Va
- Voltage will be switched off if the temperature grows too high.

5-11-3-6 Jumpers and Dip-switches

None.

5-11-3-7 LEDs

None.

(Observe the LEDs on Internal I/O to check DC Voltage Status, see "Internal I/O" on page 5-103.)

5-11-4 TX Power Supply

5-11-4-1 General Description

The TX Power is a switch mode power supply module. It is used to generate two symmetrical pairs of digitally programmable voltages for the transmitters in the Vivid 7 scanner.

A fixed Probe MUX voltage with either +/- 95 VDC or +/- 100 VDC, depending on TX Power Supply model, is used by the multiplexers in Linear Array and Convex probes with more than 128 transducer elements.

- It is enclosed in a metal frame that slides into the Card Cage.
- The module connects to the Motherboard (Backplane) through a 32 pin connector
- One or two guide pins, located between the two upper mounting screws, fits into corresponding hole(s) in the Card Cage. This “key” is used to prevent it from being plugged into scanners that use similar, but not compatible power supplies.
  - The TX Power with one guide pin is used in Vivid 7 produced with software version v3.x and earlier, and without 4D.
  - The TX Power with two guide pins was introduced for use in Vivid 7 with software version v4.0, and is needed for all Vivid 7 with 4D.

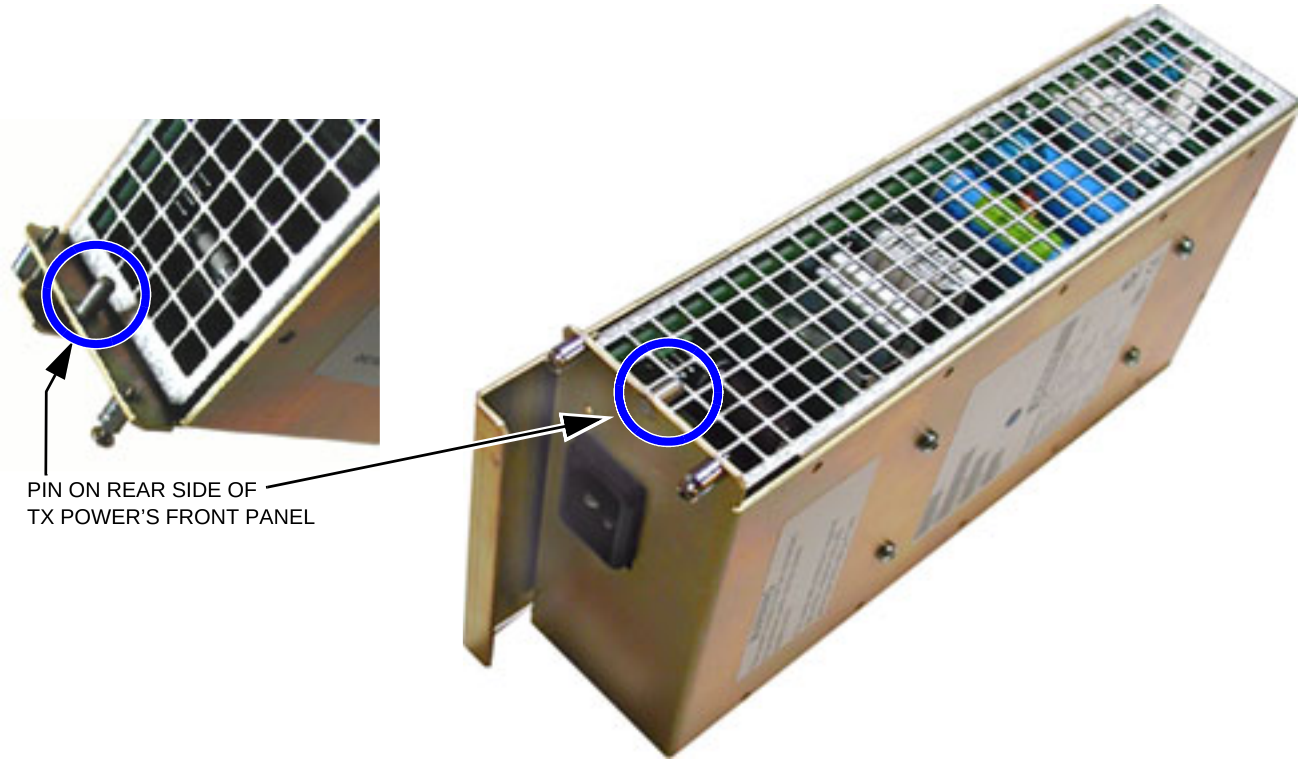


Figure 5-90 TX Power Supply: Front Panel with Key (Pin)

5-11-4-2 Location in the Unit

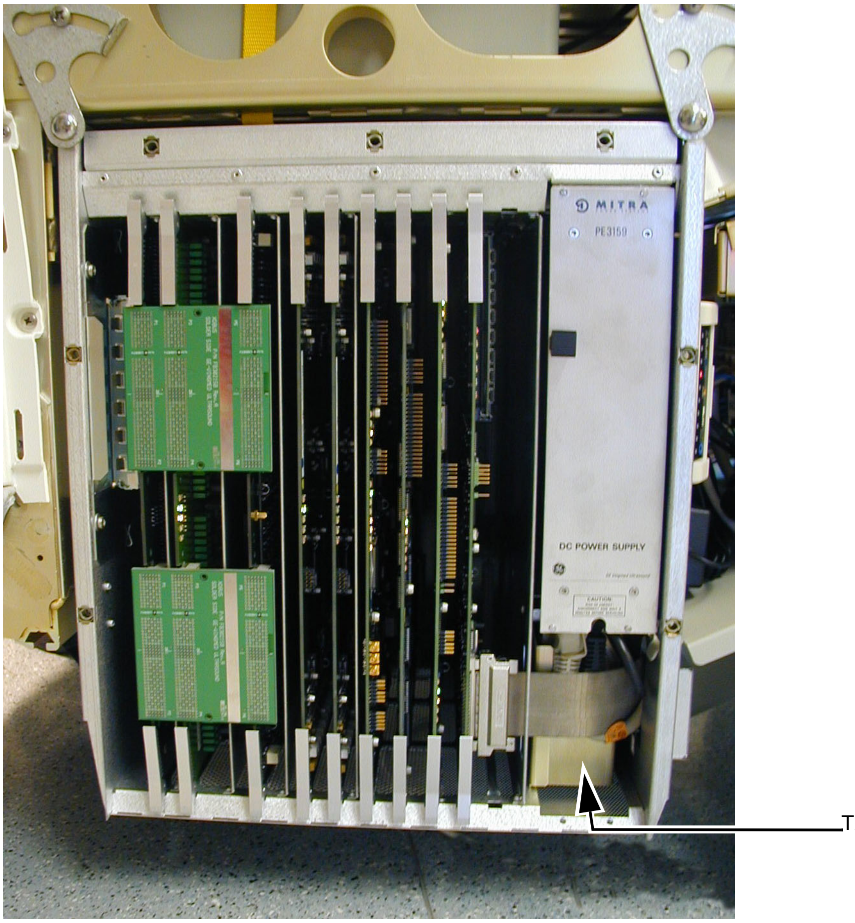

Front of scanner
MITRA
PE3159
DC POWER SUPPLY
TX Power Supply

Figure 5-91 TX Power Supply: Location in the Unit (below the DC Power Supply)

5-11-4-3 Inputs

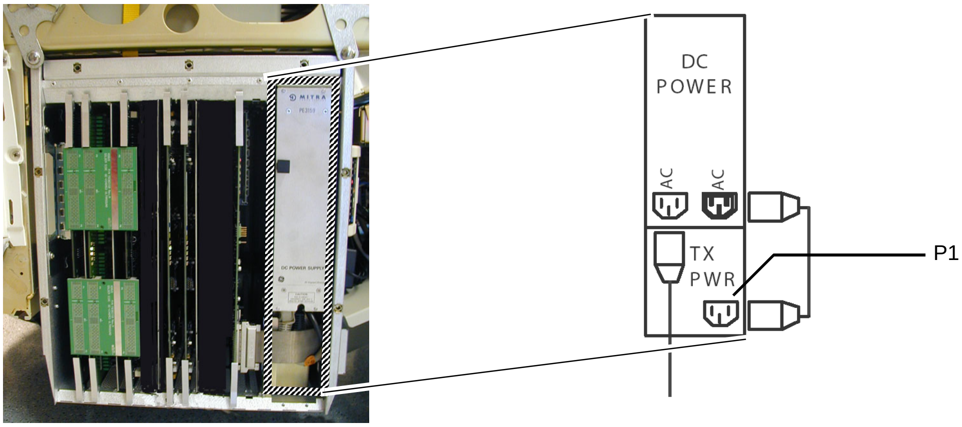


Figure 5-92 AC Voltage to TX Power

Table 5-90 Input, Plug P1, 230 VAC

INPUT	DESCRIPTION	CONNECTION FROM:
230 VAC	AC Input via a three pin male (IEC) mains inlet	Cable from the DC Power Module

5-11-4-4 Outputs - FC200386

Table 5-91 Output Voltages, Plug P2

OUTPUT	DESCRIPTION	CONNECTED TO:
TSV1	TX Voltage 1 Voltage can be programmed to vary from +/- 2.5 V to +/- 95 V Used to drive the transmitters in 2D Mode and M mode	TX board
TSV2	TX voltage 2 Voltage can be programmed to vary from +/- 2,5 V to +/- 95V Used to drive the transmitters in Doppler (CW/PW) mode and in Color Flow Mapping (CFM) mode	TX board
PMXVOUT	Probe Multiplexing Voltage A fixed +/-100 V Voltage Used for the multiplexers in linear array probes with more than 128 transducer elements	RLY board

5-11-4-5 Outputs - FB200574

Table 5-92 Output Voltages, Plug P2

OUTPUT	DESCRIPTION	CONNECTED TO:
TSV1	TX Voltage 1 Voltage can be programmed to vary from +/- 2.5 V to +/- 80V Used to drive the transmitters in 2D Mode and M mode	TX board
TSV2	TX voltage 2 Voltage can be programmed to vary from +/- 2,5 V to +/- 40V Used to drive the transmitters in Doppler (CW/PW) mode and in Color Flow Mapping (CFM) mode	TX board
PMXVOUT	Probe Multiplexing Voltage A fixed +/-100 V Voltage Used for the multiplexers in linear array probes with more than 128 transducer elements	RLY board

5-11-4-6 Fuses

- Output Power Protection Circuit with these functions:
  - Protect probe and TX board if a failure make the voltage exceed limits
  - Protect the power supply if there is a failure in probe or transmitter circuit
- A watch-dog disables the voltage (set it to zero Volt) if the;
  - serial communication with the FEC-2 module stops
  - nominal Power limit is exceeded
  - maximum Power limit is exceeded

5-11-4-7 Jumpers and Dip-switches

None.

5-11-4-8 LEDs

None.

5-11-4-9 Power Loss

A power loss may be due to:

- The Mains Switch has been switched to OFF
- The Mains cable has been disconnected
- Brown-out

If a power loss occur, all AC power distribution within the unit is lost. The Front-End Card Rack stops functioning, the peripherals and the monitor also looses its power.

On units with an internal UPS, the Back-End Processor automatically switch over to the internal battery, and the Back-End Processor starts an automatic power down sequence.

Section 5-12
Mechanical Descriptions

5-12-1 General Description, Top Console on Vivid 7

NOTE: Vivid 7 PRO is described in section 5-12-4 on page 5-145.

The Top Console includes Monitor, Monitor Shelf, Speakers and Operator Panel.

The Console’s movement backwards and forwards and to the sides is made possible by the Frogleg unit that links the Top Console to the rest of the System in a flexible multi movement joint. The handle (XY-release Handle) that unlocks the Frogleg, is located in the center lower side of the Front Handle.

The Top Console can also be moved up and down. The handle (Z-release Handle) is located in the left grip of the Front Handle. A gas spring inside the system assists in the Z movement. It is actuated by pulling the Z-release Handle and at the same time lifting up or pushing down the Console with some pressure to assist up/down motion.

A flexible harness of electrical and mechanical wires secures the connection between the Top Console and rest of the System.

5-12-2 Transporting Vivid 7

The Top Console must be locked into the center (x/y) position as indicated on the label on the Front Handle, before transporting the system.

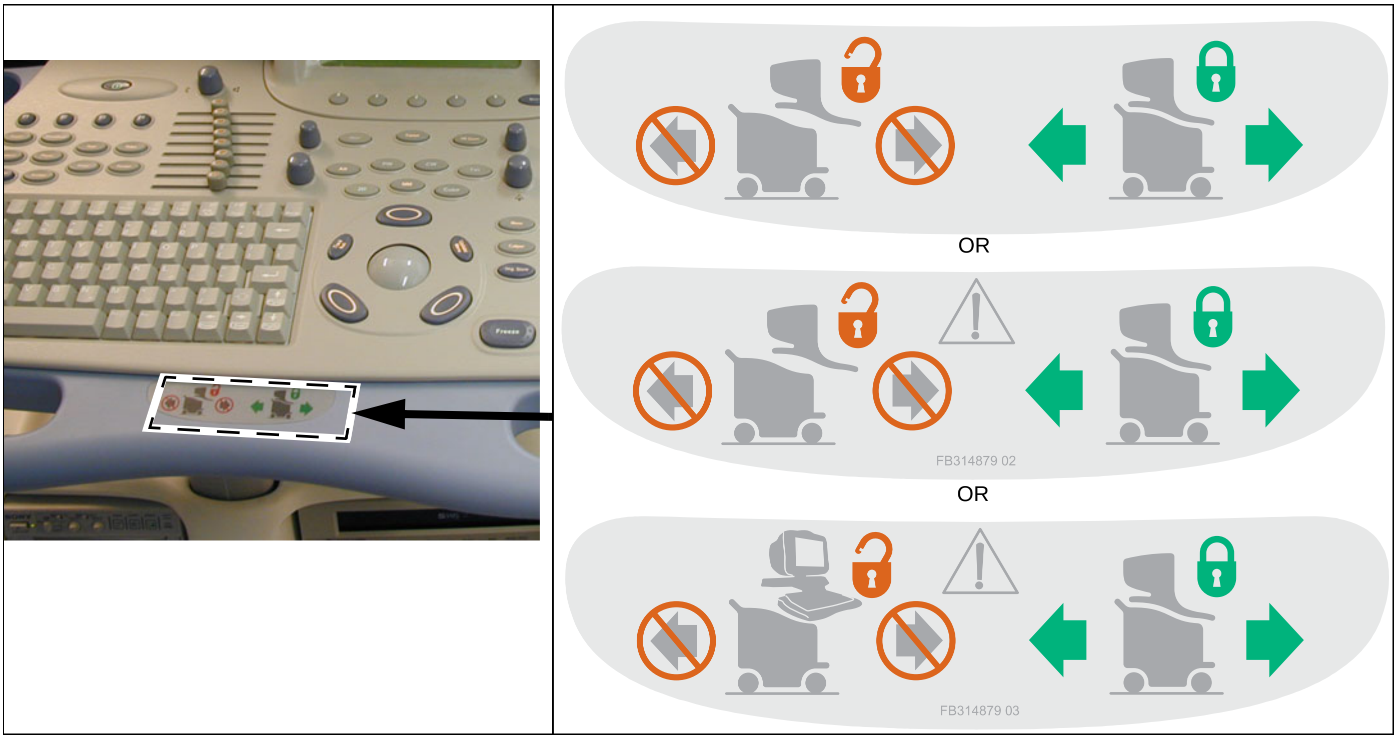


Figure 5-93 Label on Front Handle

5-12-3 Location in the Unit

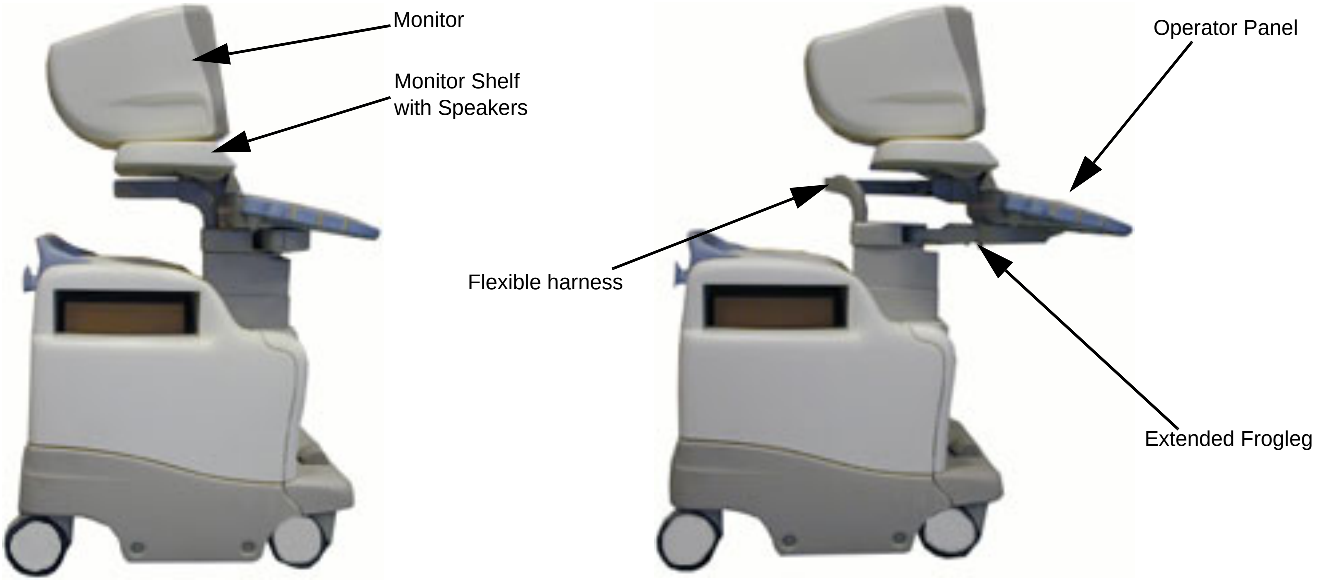

Monitor
Monitor Shelf with Speakers
Operator Panel
Flexible harness
Extended Frogleg

Figure 5-94 Top Console, upper positions

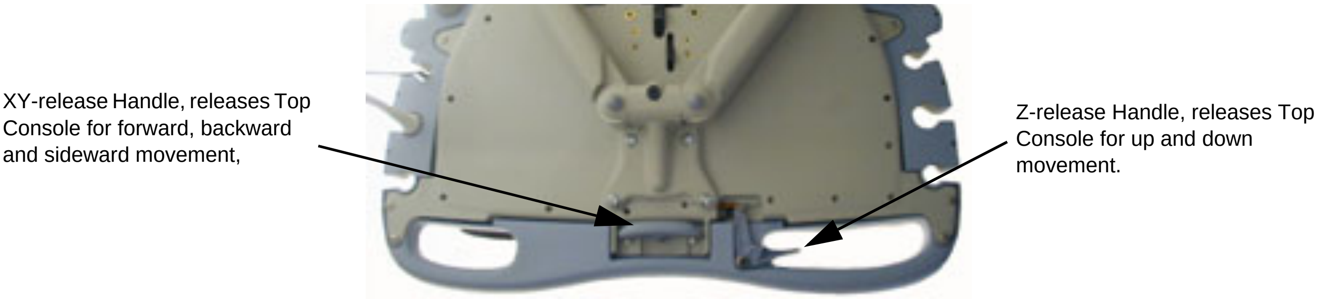

XY-release Handle, releases Top Console for forward, backward and sideward movement,
Z-release Handle, releases Top Console for up and down movement.

Figure 5-95 Release Handles location (below the Top Console)

5-12-3 Location in the Unit (cont'd)

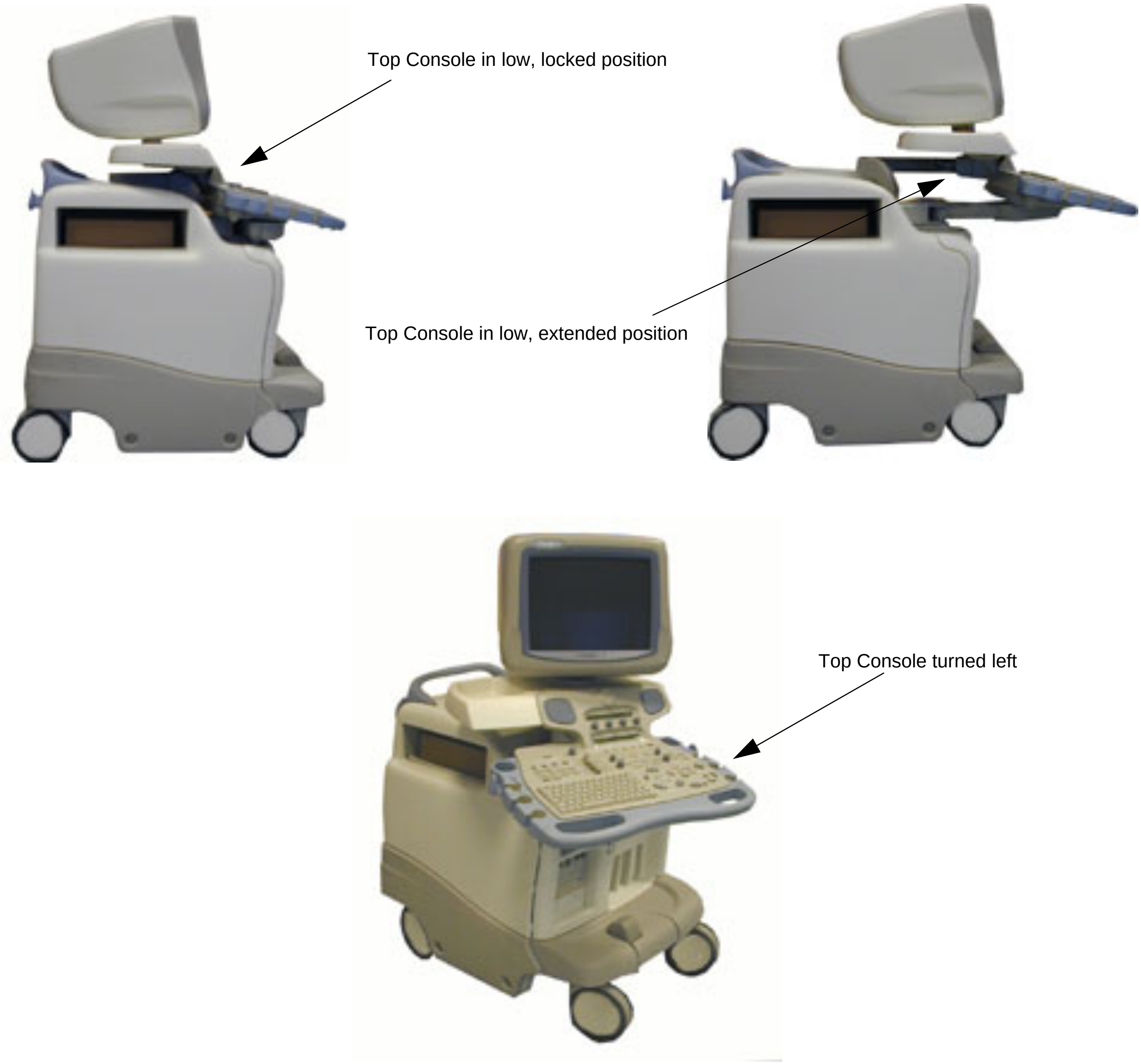

Top Console in low, locked position
Top Console in low, extended position
Top Console turned left

Figure 5-96 Top Console movement, forward and sideward

5-12-4 General Description, Top Console on Vivid 7 PRO

NOTE: Top Console on Vivid 7 is described in section 5-12-1 on page 5-141.

The Top Console includes Monitor, Monitor Shelf, Speakers and Operator Panel.

The Console can be moved from side to side. It can be locked in center position by a mechanism located inside the Console. The handle (XY-release Handle) that open for sideway movement, is located in the center lower side of the Front Handle.

The Top Console can also be moved up and down. The handle (Z-release Handle) is located in the left grip of the Front Handle. A gas spring inside the system assists in the Z movement. It is actuated by pulling the Z-release Handle and at the same time lifting up or pushing down the Console with some pressure to assist up/down motion.

A flexible harness of electrical and mechanical wires secures the connection between the Top Console and rest of the System.

5-12-5 Location in the Unit Vivid 7 PRO

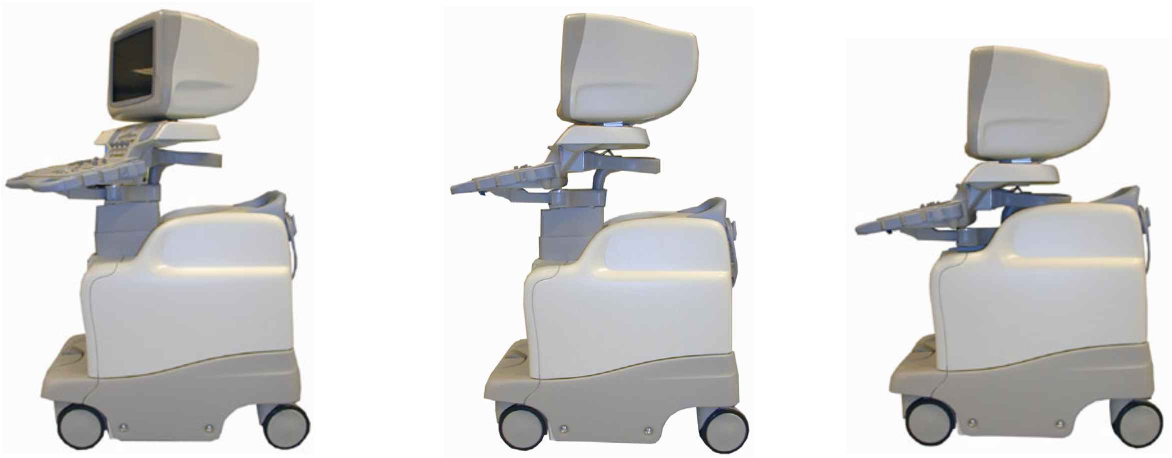
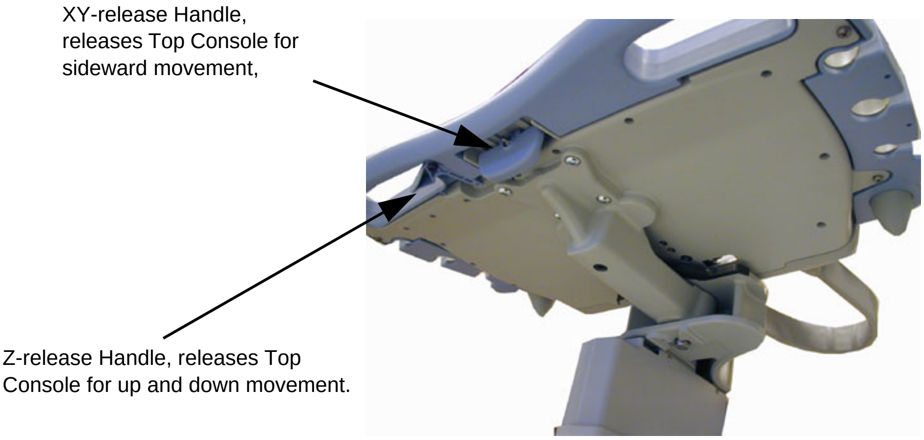


Figure 5-97 Vivid 7 PRO - Top Console Movement



XY-release Handle, releases Top Console for sideward movement,
Z-release Handle, releases Top Console for up and down movement.

Figure 5-98 Vivid 7 PRO Console Swivel Mechanism

Section 5-13
Air Flow Control

5-13-1 General Description

The Air Flow Control includes the following components:

- Dust Filter
- Dust Filter Frame
- Air Inlet Channel
- Fan Assembly

Other components that influence on the airflow is the Front-End Board Rack itself. The air is sucked in from the rear side of the system through the Filter Cover and the Filter. It passes the Fan Assembly directly into the upper part of the rear side of the Front-End Board Rack and makes a cooling air current between the Boards before it blows out against the floor. See Figure 5-99.

5-13-2 Location in the Unit

The Fan Assy is located between the Board Rack and the Filter, which can be seen on the rear side of the System.

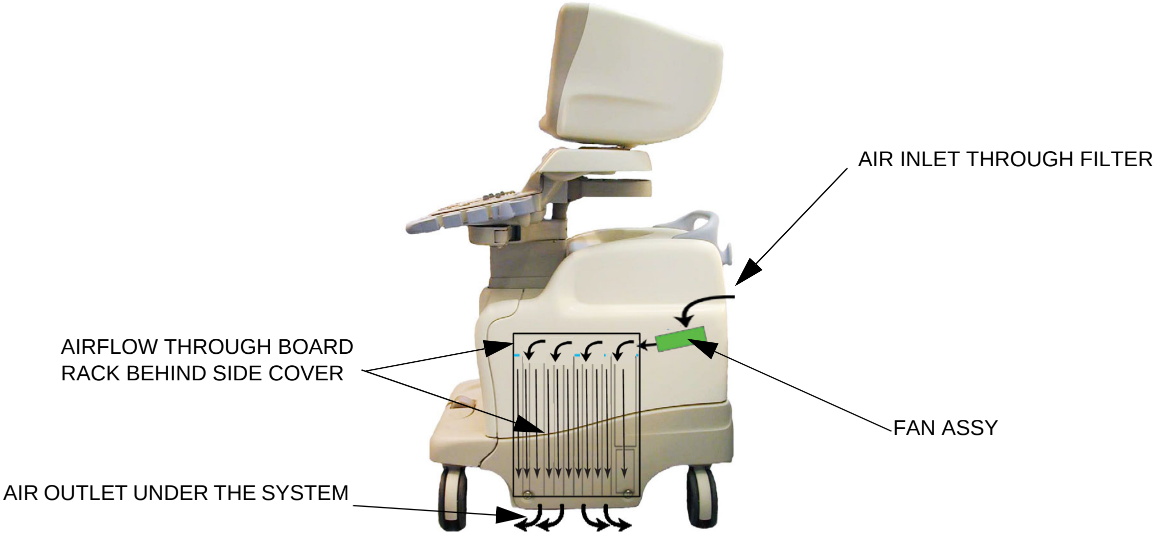

AIR INLET THROUGH FILTER
AIRFLOW THROUGH BOARD RACK BEHIND SIDE COVER
FAN ASSY
AIR OUTLET UNDER THE SYSTEM

Figure 5-99 Airflow through the System

Section 5-14
Software Overview

5-14-1 Introduction

The Vivid 7 has a huge amount of features implemented in software. The intention with this section is to give you a brief overview of the software used on Vivid 7.

5-14-2 System Software

Special versions of the System Software CDs has been made for each Back-End Processor (BEP) model used in Vivid 7s.

Depending on Application Software version, the System Software is based on either:

- Windows XP Embedded (for Application Software version v4.0 (and higher))

or

- Windows 2000 (for Application Software version v1.x, v2.x and v3.x)

5-14-3 Application Software

- Application software v4.0 (and higher) requires a Vivid 7 with RFI (FEP2).
- For Application software v3.x, special CDs have been made for BEP2.2 (Vivid 7 with RFI and FEP2) and for BEP2/BEP1 (Vivid 7 with RFT and FEP1).

5-14-4 Software Patches

Sometimes, usually in-between ordinary software releases, there may be issued “Software Patches”.

A Software Patch may be a new version of one or a few files that fixes an issue that have been found after the last released software was released. Sometimes Software Patches are used to install new files like new software drivers for peripherals.

5-14-5 Service Platform

- Information about the Service Platform is included in Section 5-17 "Service Platform" on page 5-152.
- How to use the Service Platform is described in Chapter 7, see Section 7-7 "Common Diagnostics" on page 7-48.

Section 5-15
Connectivity Theory

5-15-1 Introduction

This section describes communication and connection options between the Vivid 7 ultrasound scanner and other devices in the hospital information system.

The following cases are covered:

- A stand-alone Vivid 7.
- A Vivid 7 and one or several EchoPAC PC workstations in a “Sneaker Net” environment. “Sneaker Net” means that you use an MO Disk to move data because no network is available.
- A Vivid 7 and an EchoPAC PC workstations in a direct connect environment.
- A Vivid 7 and a DICOM server in a network.

5-15-2 The Dataflow Concept

Communication between the Vivid 7 ultrasound unit and other information providers on the network takes the form of dataflows. Each dataflow defines the transfer of patient information from either an input source to the unit, or from the unit to an output source (see examples in Figure 5-100 on page 5-150).

Patient information can include demographic data and images, as well as reports and Measurement and Analysis (M&A) data.

A dataflow is a set of pre-configured services. Selecting a dataflow will automatically customize the ultrasound unit to work according to the services associated with this dataflow.

By utilizing dataflows, the user can configure the Vivid 7 ultrasound unit to optimally meet the needs of the facility, while keeping the user interface unchanged. Once the dataflow is selected, the actual location of the database is entirely transparent.

5-15-3 New Dataflows

New dataflows can only be added in allowed combinations.

The matrix in the table below represents the allowed combinations of inputs and outputs in a dataflow.

Table 5-93 Allowed combinations of inputs and outputs in a dataflow

Output → Input ↓	No Output	Database	Remote Database	DICOM MOD 5.25	DICOM MOD 3.5	DICOM Storage	DICOM Print	Database + DICOM MOD 5.25/3.5	Database + DICOM Storage	Remote Database + DICOM MOD 5.25/3.5	Remote Database + DICOM Storage
Database		X						X	X		
Remote Database			X							X	X
DICOM Worklist						X					
DICOM CD	X										
DICOM MOD 5.25				X							
DICOM MOD 3.5					X						
Query/Retrieve	X										
EchoPAC Mac	X										
Worklist/database		X							X		
Worklist/rem database			X								X
No input device						X	X				

5-15-4 Dataflow Naming Convention

The predefined dataflows have descriptive names.

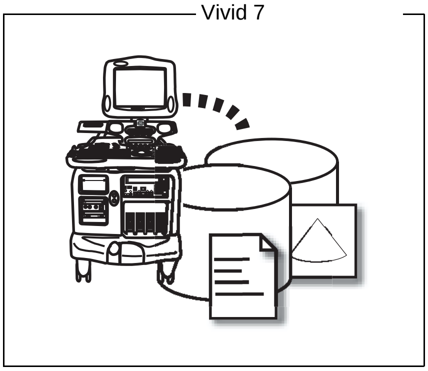
Example: *LocalArchive-MOD dataflow*

The name indicates that patient data is archived locally in the archive on the internal hard disk and images are stored to an MO disk.

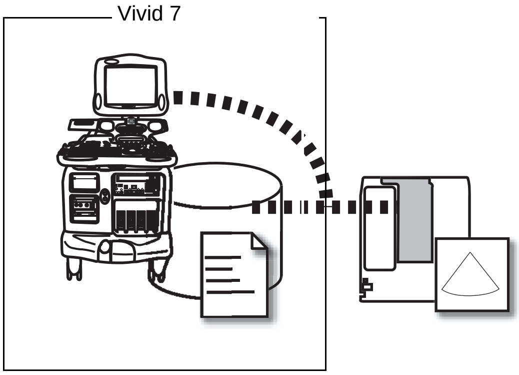
A list of all the predefined dataflows is included in the Vivid 7 User's Manual.

5-15-5 Dataflow Examples

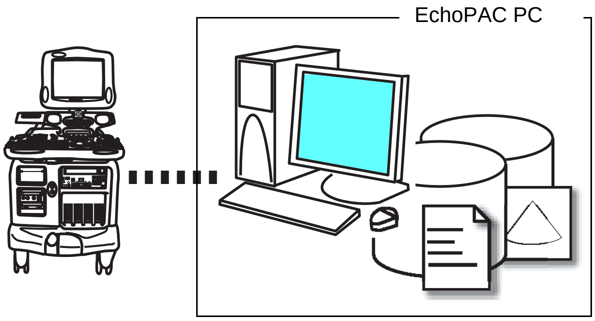
LocalArchive-Int.HDdataflow:
The local database is used for patient archiving.
Images are stored to internal harddrive.



LocalArchive-MOD dataflow:
The local database is used for patient archiving.
Images are stored to a MOD



RemoteArch-RemoteHD dataflow:
A remote database is used for patient archiving.
Images are also stored to a remote archive.



Worklist/Local Archive-DICOMServer/Int.HD dataflow:
Search in the DICOM Modality Worklist, the patient found is copied into local database. The patient information and the examination results are stored to the local database. Images are stored to a DICOM server and to an image network volume on the local harddrive.

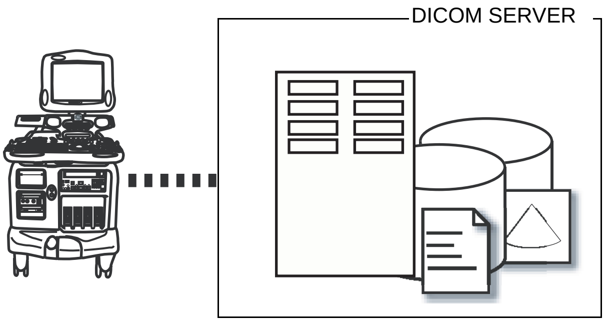


Figure 5-100 Examples of Dataflows

5-15-6 Stand-alone Vivid 7

In this case, images will most likely be reviewed from VCR tape. If digital images are stored, they should be saved directly on a MOD.

5-15-7 “Sneaker Net” Environment

In this case, the EchoPAC PC (one or several) is used for review of studies acquired on one or more Vivid 7/Vivid 7 PRO without being connected in a network. Images can be stored on the scanner’s internal hard drive (recommended) or on a dedicated MOD.

- **Images Stored on Internal Hard drive**

  In this configuration images are first stored on the scanner’s hard drive and then exported from the scanner’s hard drive to a sneaker MOD and finally imported from the sneaker MOD to the EchoPAC PC’s internal hard drive.

- **Images Stored on Dedicated MO Disk**

  In this configuration the images are stored directly on a dedicated MOD and imported to the EchoPAC PC’s internal hard drive.

5-15-8 Direct Connection from Vivid 7 to an EchoPAC PC Workstation

In this case, the data is transferred from the Vivid 7 to a dedicated EchoPAC PC Workstation over an Ethernet connection.

The connection may be done in one of three ways:

- with a crossover cable as a Peer-to-Peer Network
- connection via a Local Area Network (LAN) - set up for this special use only
- connection via the hospital network (Local Area Network - LAN or Wide Area Network - WAN)

The database from the EchoPAC PC is used as the master and images are stored directly to the EchoPAC PC internal hard drive.

In this configuration the scanner is just an intermediate acquisition unit which after completion of a study, will not contain any patient information, measurements or images. The acquisition can be done online or offline.

5-15-9 Vivid 7 and a DICOM Server in a Network

In this case, the Vivid 7/Vivid 7 PRO is configured to work with a DICOM server in a network environment. Usually, this will be the hospital network. Images are first saved on the local image buffer on the scanner. At the end of the examination the images are sent to the DICOM server via a DICOM spooler. This scenario requires that the scanner is configured to be connected to the DICOM server.

Section 5-16
Product Manuals

- The User Manuals/User Guides are available in English and several other languages. Available manuals are listed in Chapter 9. See: Section 9-32 "Product Manuals" on page 9-108.
- The Service Manual (this manual) is Part Number FC091194.
- The Vivid 7 Peripherals Installation Manual is Part Number FC294048. It describes how to install or replace internal (on-board) peripherals.

Section 5-17
Service Platform

5-17-1 Introduction

The Service Platform contains a set of software modules that are common to all ultrasound and cardiology systems containing a PC backend. This web-enabled technology provides linkage to e-Services, e-Commerce, and the iCenter, making GE's scanners more *e-enabled* than ever. The Service Platform will increase service productivity and reduce training and service costs.

5-17-2 *iLinq* Interactive Platform Features

Many of the services of the Common Service Platform come from its integration with *iLinq*. The following sections contain a brief introduction of *iLinq's* features.

5-17-2-1 Web Server/Browser

The Service platform and other Service software use the *iLinq* web server and the Netscape® browser (earlier versions) or Internet Explorer® browser.

5-17-2-2 Connectivity

NOTE: *This feature that allow the customer to contact the GE OnLine Center are available for Warranty and Contract customers only.*

This feature provides basic connectivity between the scanner and the OnLine Center (OLC).

5-17-2-3 Configuration

This feature provides the interfaces to configure various *iLinq* parameters.

5-17-2-4 Contact GE

NOTE: *This feature that allow the customer to contact the GE OnLine Center are available for Warranty and Contract customers only.*

Allows for an on-screen one-touch button used to contact the OnLine Center and describe problems with their scanner in an easy and convenient way.

5-17-2-5 Interactive Application

The main application is displayed in the form of HTML pages whenever the browser starts. This is the entry point for any user to start any *iLinq* application.

5-17-3 Global Service User Interface (GSUI)

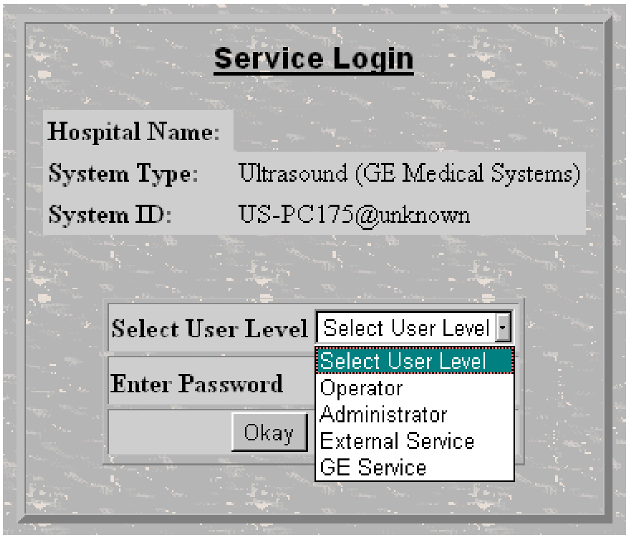
5-17-3-1 Internationalization

The user interface provided by the service platform is designed for GE personnel and as such is in English only. There is no multi-lingual capability built into the Service Interface.

5-17-3-2 Service Login

Select the wrench icon (🔧) in the status bar at the bottom of the scan display screen.

This icon links the user or the Field Engineer (FE) to the service login screen.



Service Login

Hospital Name:
System Type: Ultrasound (GE Medical Systems)
System ID: US-PC175@unknown

Select User Level: Select User Level

Enter Password

Figure 5-101 Service Login Screen

5-17-3-3 Access / Security

The service interface has different access and security user levels. Each user is only granted access to the tools that are authorized for their use.

Table 5-94 Access Authorization

USER LEVEL	ACCESS AUTHORIZATION	PASSWORD
Operator	Authorized access to specified diagnostics, error logs and utilities. Same acquisition diagnostic tests as GE Service.	uls
Administrator		uls
External Service		gogems

Every access request, whether successful or not, will be logged into a service access log that is viewable to authorized users.

See Chapter 7 for more info about InSite and the Global Service User Interface.

5-17-4 System Logs

5-17-4-1 “Locked” System Log

If the system appears to be locked, please wait **at least 60 seconds** for the watchdog to trap the situation. This will, if the situation is trapped, bring up a dialog telling that the system is not responding.

1.) Press '**Restart**' to restart the application. This will save a special debug log. When the system restarts it will show a dialog where it requests you to save the log.
2.) Enter a descriptive text then press '**Save**'.
3.) To export the log, press **Alt+D**. This will bring up the same dialog again.
4.) Now select destination and choose '**Export**' to write the log-files to CD or MO.

5-17-4-2 Other Logs

Other available logs can be viewed via the Common Service Interface,
see 7-6-4 "Error Logs" on page 7-11.

5-17-5 Restart Vivid 7 After Diagnostics

Always shutdown the system and reboot after a diagnostics session.

Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of this Chapter

This section describes how to adjust the scanner.

6-1-2 Contents in this Chapter

Table 6-1 Contents in Chapter 6

SECTION	DESCRIPTION	PAGE NUMBER
6-1	Overview	6-1
6-2	Date and Time Adjustments	6-1
6-3	Daylight Saving Time (DST) Adjustments	6-1
6-4	Power Supply Adjustments	6-1
6-5	LCD Monitor Adjustments	6-2
6-6	CRT Monitor Adjustments	6-3
6-7	Front-End Alignment Procedure (Beamformer Calibration)	6-6
6-8	Direction Lock and Brake Adjustment	6-9

Section 6-2
Date and Time Adjustments

Please refer to: 3-7-1-3 "Date and Time Adjustments" on page 3-29.

Section 6-3
Daylight Saving Time (DST) Adjustments

From the factory, the automatic DST function has been disabled.

Manually adjust the DST at the start and at the end of the DST period (if needed).

Section 6-4
Power Supply Adjustments

It is not possible to adjust the power supplies on this unit.

Section 6-5
LCD Monitor Adjustments

6-5-1 Overview

This procedure describes how to adjust the LCD monitor for use with Vivid 7, software version v6.x and newer. It also describes how to set up the Vivid 7 to the factory default for LCD use.

The LCD adjustment procedure contains two main tasks:

1.) Adjust LCD monitor
2.) Select gamma curve

6-5-2 Cautions and Warnings

N/A

6-5-3 Access to Adjustments

The adjustments of the LCD monitor is done via controls (buttons) on front of the LCD monitor.

On the LCD monitor:

- Press **Menu** to activate the **OnsScreenDisplay** (**OSD**) menu.
- Navigate by using the **up/down arrow buttons**.
- Select by using the **Return** button.
- Back up in the menu tree using the **Menu** key.

The **AUTO** and **PIP** keys should not be used.

The menu system has five main icons/menus:

- Input
- Picture
- MagicColorPro
- PIP
- Setup

Section 6-6
CRT Monitor Adjustments

6-6-1 Cautions and Warnings

N/A

6-6-2 Access to Adjustments

The adjustments of the monitor is done via controls (buttons) on front of the monitor.

6-6-3 Degaussing the CRT Monitor

Degaussing refers to the process of removing magnetic-field effects from the monitor. Operation of the monitor within a magnetic field may adversely effect color purity. Degaussing can be used to correct this problem.

To activate the manual degauss:

1.) Press either the **<<<** or **>>>** monitor adjustment button while the brightness/contrast adjustment indicator is not displayed on the monitor. To cancel the manual degauss, press the **<<<** or **>>>** adjustment button again.
2.) Press the toggle button for brightness and contrast.
3.) Press either the **<<<** or **>>>** monitor adjustment.

NOTE: The monitor automatically degausses at power on.

6-6-4 Adjusting the CRT’s Contrast and Brightness

The display monitor’s contrast and brightness controls may need periodic adjustment due to changes in ambient light. They are adjusted from the three buttons on the front part of the display monitor.

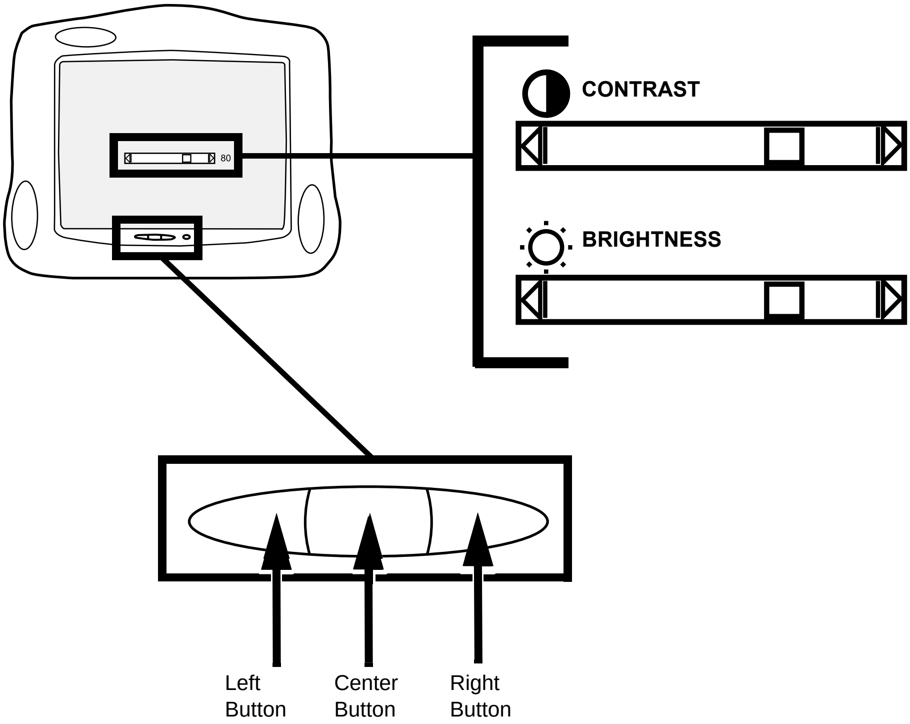


Figure 6-1 Adjust Contrast and Brightness

6-6-4-1 Adjust Contrast

The factory default Contrast settings:

- BT03/04/05/06 units: Contrast = 65%
- BT02 units: Contrast = 100%

Follow the steps below to adjust the monitor’s contrast setting:

1.) Press Left button on the display monitor once (see *Figure 6-1 "Adjust Contrast and Brightness" on page 6-4*).

2.) Press Right button to increase contrast.

3.) Press Center button to decrease contrast.

The amount of contrast is shown on a slider on the screen (see *Figure 6-1 "Adjust Contrast and Brightness" on page 6-4*).

6-6-4-2 Adjust Brightness

The factory default Brightness settings:

- BT03/04/05/06 units: Brightness = 32%
- BT02 units: Brightness = 40%

Follow the steps below to adjust the monitor's brightness setting:

1.) Press the Left button on the display monitor twice (see *Figure 6-1 "Adjust Contrast and Brightness" on page 6-4*).

2.) Press the Right button to increase brightness.

3.) Press the Center button to decrease brightness.

The amount of brightness is shown on a slider on the screen (see *Figure 6-1 "Adjust Contrast and Brightness" on page 6-4*).

Section 6-7
Front-End Alignment Procedure (Beamformer Calibration)

6-7-1 Introduction

Each A/D converter on the BF boards has an offset error (i.e. gives an output code different from 00 Hex with an input voltage of 0V). This offset error may cause artifacts in some modes of operation (2D and TVI) due to inaccuracy in the demodulation process. In order to deal with this problem, the software has support for cancelling of these offset errors. This is done by first reading the offset error and then accounting for these numbers later during the normal processing.

Beamformer Calibration is performed to calibrate each ADC channel of the two Beam Former (BF) board inputs. The system calibrates the Beamformer ADCs to zero output when there is no signal on the input.

These bias voltages are stored on hard disk in Back-End Processor.

The Front-End Alignment procedure can be performed either as described below, or via the GSUI. See: 7-6-7 "Calibration" on page 7-33.

6-7-2 When to Use this Procedure

This procedure should be performed;

- when installing a new Vivid 7
- after software has been updated or replaced
- when BF boards have been interchanged
- when a BF board has been replaced
- when the Back-End Processor has been replaced

6-7-3 Front-End Alignment Procedure

1.) Disconnect all connected probes.

2.) Turn on the Vivid 7.

3.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

4.) Select **System**

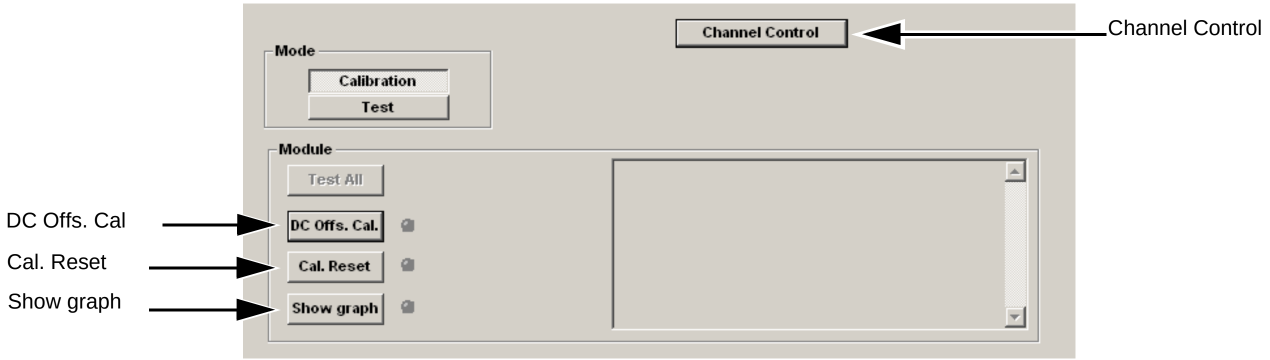


Figure 6-2 Calibration Dialog

5.) Select **DC Offs. Cal** to start the DC Offset calibration of the Beam Formers (Front-End Alignment).

6.) Wait for the calibration to take place.

Front-End Alignment Description

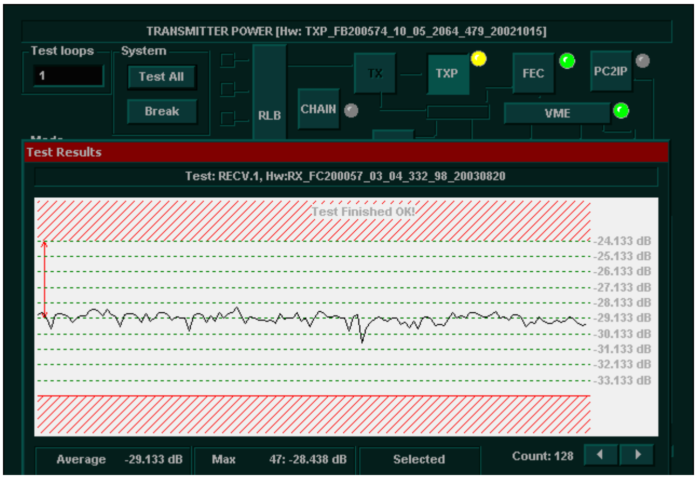
- Each A/D converter will get 0V input (by setting ATGC to minimum).
- One by one channel will be digitized and the result put in the IQ buffer on the RFT board.
- The BEP will then read the IQ buffer and computes a value per channel. These computed values are compared to an upper/lower limit.
- If all read values are ok, the message PASSED will appear. If values exceeding the limits are read, the system will prompt you with FAILED and a message will tell you which BF board is bad.
- The resulting offsets for each channel are stored in a file on the Back-End Processor's hard disk.
- The values can be plotted in a diagram **Show graph**).

7.) When finished, select **Show Graph**.

Wavy line signifies system has been calibrated. See Figure 6-3 "DC Calibration of the Beam Former AD-converters Passed" on page 6-8.

A Straight line signifies that the system has not been calibrated and can be the cause of image quality issues.

6-7-3 Front-End Alignment Procedure (cont'd)


TRANSMITTER POWER [Hw: TXP_FB200574_10_05_2064_479_20021015]

Test loops: 1

Test Results

Test: RECV.1, Hw:RX_FC200057_03_04_332_98_20030820

Test Finished OK!

Average -29.133 dB

Max 47: -28.438 dB

Count: 128

System
Test All
Break
RLB
CHAIN
TX
TXP
FEC
PC2IP
VME
-24.133 dB
-25.133 dB
-26.133 dB
-27.133 dB
-28.133 dB
-29.133 dB
-30.133 dB
-31.133 dB
-32.133 dB
-33.133 dB
Selected

Figure 6-3 DC Calibration of the Beam Former AD-converters Passed

NOTE: *The LEDs displayed in the below individual board sections are relevant when the system is in the default setting (2D-mode).*

8.) Restart Vivid 7.

NOTE: *Always reboot the scanner after Front-End Alignment is finished and verify proper operation.*

NOTE: *Do Not select "Cal Reset" after performing calibration. This will destroy the file located on the Back-End Processor, the image quality will not be optimized and a new calibration will be needed.*

Section 6-8
Direction Lock and Brake Adjustment

6-8-1 Front Caster Brakes Adjustment Procedure

6-8-1-1 Manpower

2 persons

6-8-1-2 Tools

- Hexagon key 3/32” inch
- Phillips screw driver size 2

6-8-1-3 Preparations

1.) Set Rear Brakes to prevent system from rolling.

2.) Remove Front Bumper , see "Front Bumper Removal Procedure" on page 8-100.

6-8-1-4 Front Caster Brakes Adjustment

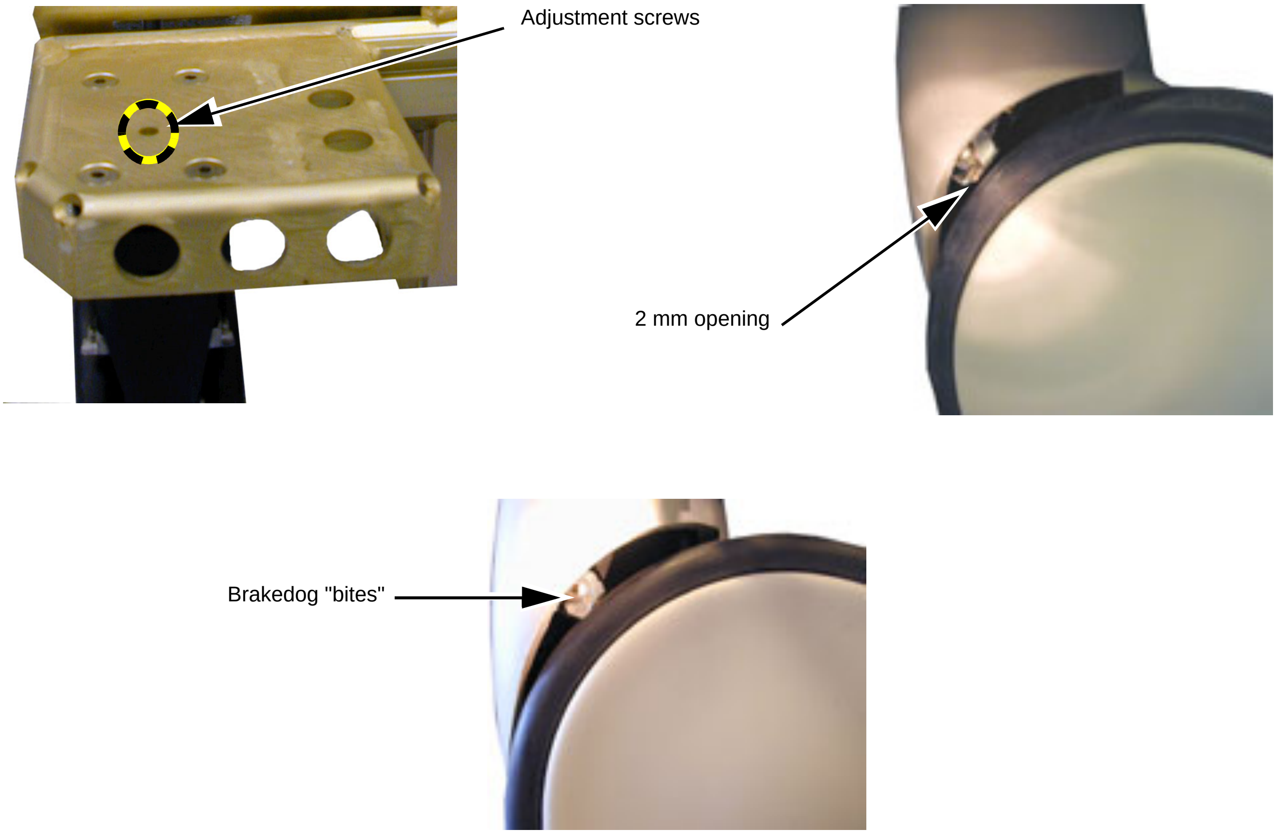


Figure 6-4 Front Brakes adjustment

1.) Use a hexagon key, and screw the adjustment screw until the opening between brake dogs and tires are approximate 2 mm.

2.) Install Front Bumper , see "Front Bumper Installation Procedure" on page 8-100.

3.) Test Front Brakes.

6-8-2 Direction Lock Adjustment Procedure

6-8-2-1 Manpower

1 person, 30 minutes

6-8-2-2 Tools

Open end wrench, 13 mm

6-8-2-3 Preparations

1.) Block Rear Casters.
2.) Push down Direction Lock Pedal.
3.) Turn Casters until they locks in forward pointing position.

6-8-2-4 Direction Lock Adjustment

1.) Loosen the retaining nuts on the brake rods on both Front Casters to allow room for adjustment.
2.) Remove the lock pins that secures the balljoints (See Figure 6-5).
3.) Pull balljoints apart.

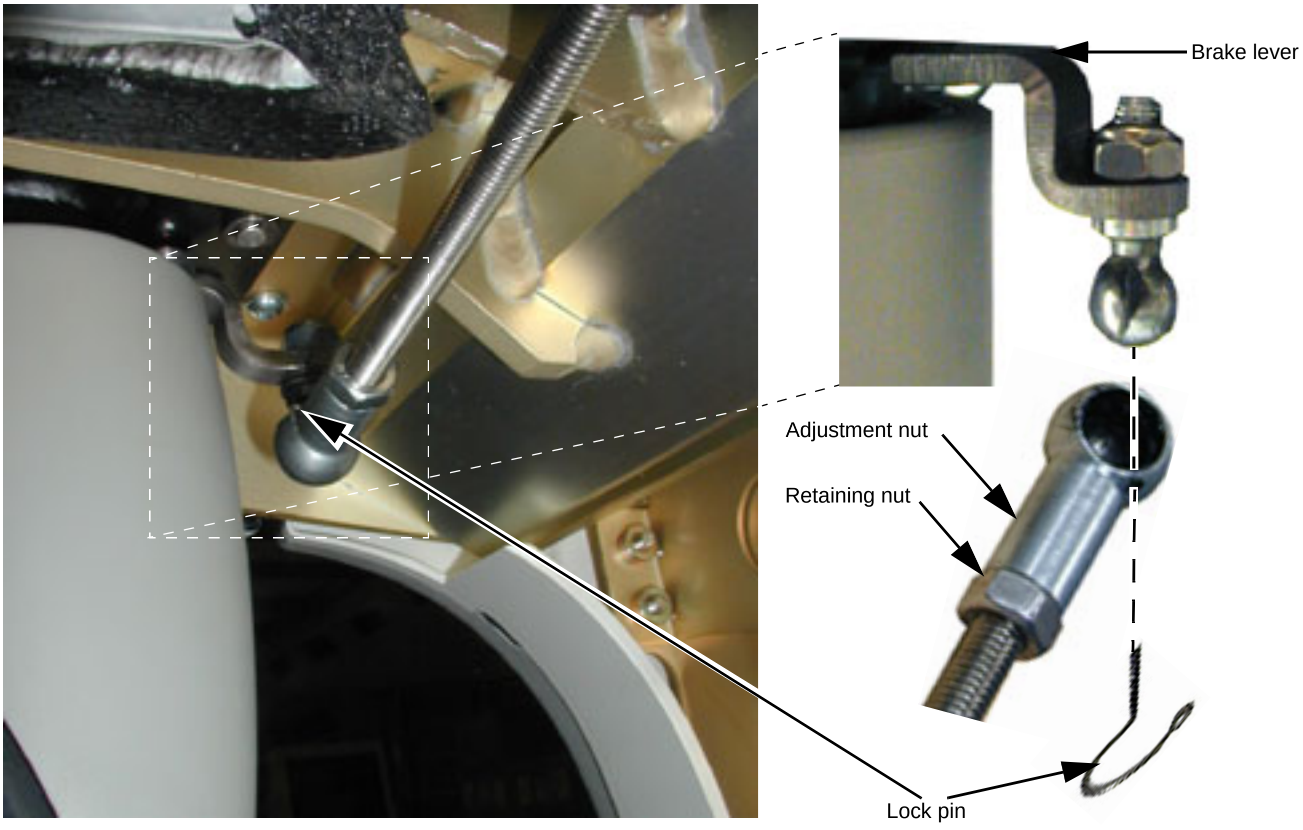


Figure 6-5 Front Caster Brake Arm and Ball Joint Parts

4.) Each part of the separated balljoint shall match each other when the brake lever on the Casters are in direction lock position, which is in left position on both Casters.

6-8-2-4 Direction Lock Adjustment (cont'd)

5.) Turn adjustment nuts until the balljoints matches.

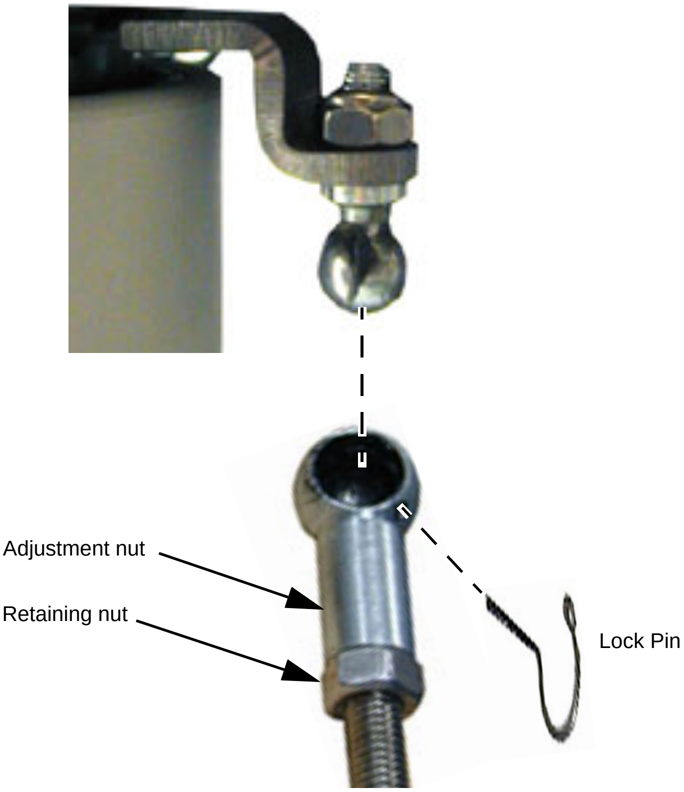

Adjustment nut
Retaining nut
Lock Pin

Figure 6-6 Balljoint with Lock Pin

6.) Press the balljoint together.

7.) Install the lock pins, see Figure 6-5.

8.) Fasten the retaining nuts.

9.) Test Direction Lock.

6-8-3 Rear Brakes Adjustment

6-8-3-1 Manpower

2 persons, 1 hour

6-8-3-2 Tools

- Hexagon key 3/32 inch
- Phillips screw driver size 2

6-8-3-3 Preparations

1.) Remove Filter Cover , see "Upper Rear Cover Removal Procedure" on page 8-6.
2.) Remove Lower Rear Cover , see "Lower Rear Cover Removal Procedure" on page 8-10.
3.) Remove the Caster , see "Rear Casters Removal Procedure" on page 8-92

6-8-3-4 Rear Brakes Adjustment

1.) Use a 3/32 inch hexagon key to adjust the brake until the space between brakedogs and tires are approximate 2 mm.

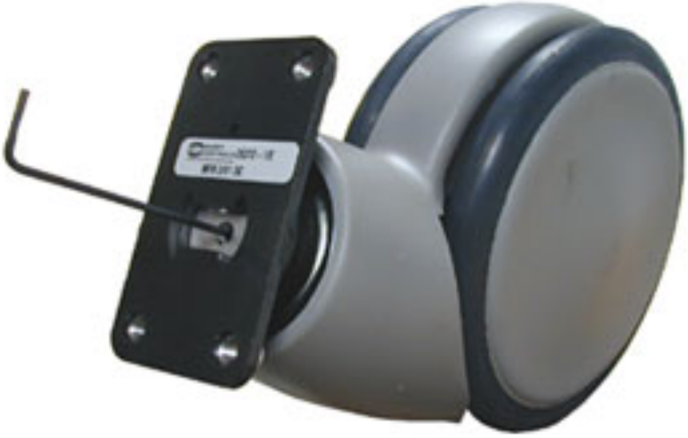


Figure 6-7 Rear Brakes adjustment

1.) Replace the Caster and tightly fasten it with four screws.
2.) Install Lower Rear Cover , see "Lower Rear Cover Installation Procedure" on page 8-10.
3.) Install Filter Cover , see "Upper Rear Cover Installation Procedure" on page 8-6.

WARNING ***Use extreme caution in the next two steps. The scanner will be unstable.***

4.) Remove the Wooden Wedge.
5.) Roll the system off the Bevel Edged Board.

Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of this Chapter

This section describes how to setup and run the tools and software that help maintain image quality and system operation. Very basic host, system and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

NOTE: *Diagnostics must be run from start-up.*

NOTE: *After Diagnostics are performed/run, the system must be rebooted. If not done, this could cause subsequent false failures due to the machine being left in an unknown state.*

7-1-2 Contents in this Chapter

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
7-1	Overview	7-1
7-2	Service Tools Overview	7-2
7-3	Frequently Asked Questions - FAQ	7-3
7-4	Service Safety Considerations	7-4
7-5	Gathering Troubleshooting Data	7-5
7-6	Diagnostics Tools	7-7
7-7	Common Diagnostics	7-48
7-8	Acquisition Diagnostics	7-63

Section 7-2
Service Tools Overview

7-2-1 Service Software Tools

Two major Service Software tools are available:

- Common Service Diagnostic Interface (GSUI)

  This software tool makes it possible for you to do tests on various functions on the Back-End Processor. It also includes an acquisition test that tests most of the PCBs in the Front-End Rack. If this test fails, detailed Acquisition Diagnostics tests are available via Vivid 7's software menus.

- Acquisition Diagnostics

  This software tool includes detailed Acquisition Diagnostics tests available via Vivid 7's software menus. It is running on the Back-End Processor too. It includes both a Test All function that is the same test as available from the GSUI, but also tests on PCB level.

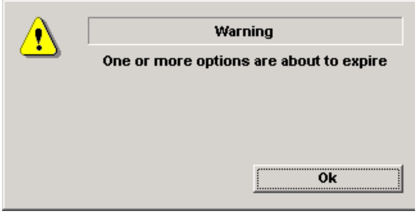
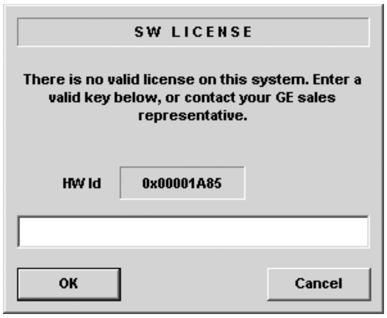
7-2-2 Special Service Tool

Vivid 7 Test Attenuator, Part Number: AA200215

Section 7-3
Frequently Asked Questions - FAQ

7-3-1 Error Message(s) During Start Up

Table 7-2 Error Message(s) During Start Up

ERROR MESSAGE	DESCRIPTION	WHAT TO DO
 Warning One or more options are about to expire 	This message, displayed when starting Vivid 7, indicates that one or more of the installed options soon will expire. Typical, this will be the case when a demo option is about to expire.	If you want to keep the option(s) active, it is time to order the option(s) now. Contact your GE sales representative for more details. If you don't need the option(s), you can ignore this message. You must select **OK** to continue the start up of Vivid 7.
 SW LICENSE There is no valid license on this system. Enter a valid key below, or contact your GE sales representative. HW Id 0x00001A85 	This message indicates that all of the installed options have expired. Typical, this will be the case when all demo options have expired.	Contact your GE sales representative for more details.

Section 7-4
Service Safety Considerations

DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

WARNING ***IF THE COVERS ARE REMOVED FROM AN OPERATING Vivid 7, SOME METAL SURFACES MAY BE WARM ENOUGH TO POSE A POTENTIAL HEAT HAZARD IF TOUCHED, EVEN WHILE IN SHUT DOWN MODE.***

WARNING ***EXPLOSION WARNING***

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE. OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

CAUTION **Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.**

Section 7-5
Gathering Troubleshooting Data

7-5-1 Overview

There may be a time when it would be advantageous to capture trouble images and system data (logs) for acquisition through remote diagnostics (InSite) or to be sent back to the manufacturer for analysis.

There are different options to acquire this data that would give different results.

7-5-2 Collect Vital System Information

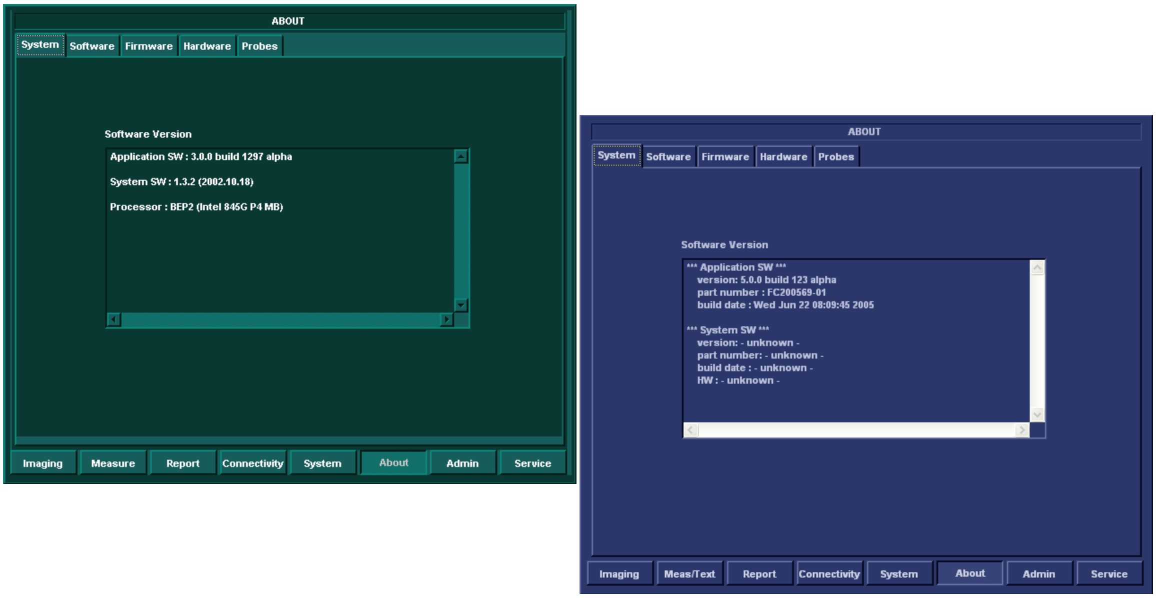
The following information is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

Product Name = VIVID 7

From the *Config* (**F2**)>*About* screen:

- **Applications Software**
  - Software Version
  - Software Part Number
- **System Software**
  - System Software Revision
  - System Software CD Part Number
- **Back-End Processor (BEP) Model**

NOTE: The contents on the About tab will vary depending on the software version


ABOUT
System
Software
Firmware
Hardware
Probes
Software Version
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
ABOUT
System
Software
Firmware
Hardware
Probes
Software Version
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

```
Application SW : 3.0.0 build 1297 alpha

System SW : 1.3.2 (2002.10.18)

Processor : BEP2 (Intel 845G P4 MB)
```

```
*** Application SW ***
   version: 5.0.0 build 123 alpha
   part number : FC200569-01
   build date : Wed Jun 22 08:09:45 2005

*** System SW ***
   version: - unknown -
   part number: - unknown -
   build date : - unknown -
   HW : - unknown -
```

Figure 7-1 The About Screen

7-5-3 Collect a Trouble Image with Logs

If the system should malfunction, press the Alt-D keys simultaneously. This will collect a screen capture of the monitor, system presets and several log files in a date and time stamped zip file.

NOTE: *Power Supply and Temperature logs are not currently being updated by the Vivid 7.*

This Alt-D function is available at all times.

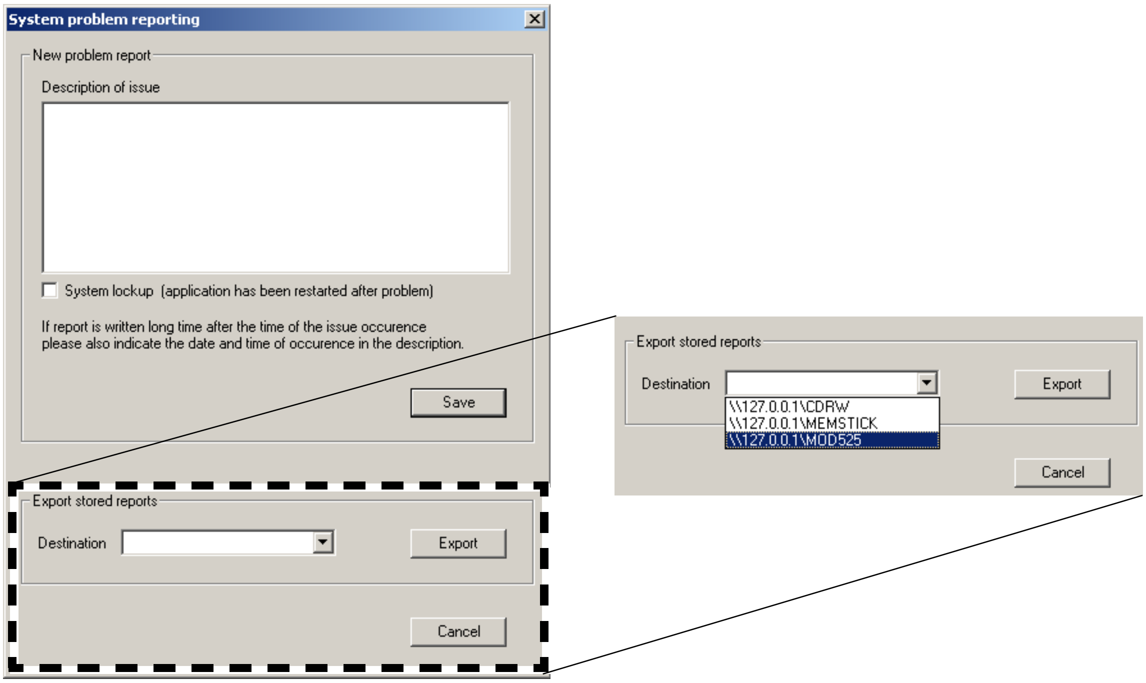

System problem reporting
New problem report
Description of issue
☐ System lockup (application has been restarted after problem)
If report is written long time after the time of the issue occurence please also indicate the date and time of occurence in the description.
Save
Export stored reports
Destination
Export
Cancel
\\127.0.0.1\CDRW
\\127.0.0.1\MEMSTICK
\\127.0.0.1\MOD525

Figure 7-2 ALT-D Dialog Box

When Alt-D is pressed, a menu box appears that allows for;

- a place to enter a description of the issue
- a check box to indicate a System lockup
- a choice to Export to a pre-formatted MOD, CD-RW or save to the Export directory D: drive (for remote viewing through InSite).

NOTE: *NOTE: You **MUST** select one of the available devices as the destination device if it is to be different than the default Export directory on the hard drive.*

The screen capture is a bitmap which eliminates the possibility of artifacts from compression.

Section 7-6
Diagnostics Tools

7-6-1 Diagnostic Procedure Summary

7-6-1-1 Purpose of this Sub-Section

These software based diagnostics tools are available on Vivid 7:

- Common Service Diagnostic Interface (GSUI) and
- Vivid 7's Front-End System Test

To be able to use these Service Tools, the Back-End Processor must be up and running to some extent. If the Back-End Processor doesn't starts, it's not possible to use the software service tools!

A typical approach would be to first log on to the GSUI and run the tests there. If the Acquisition test fails, it is time to switch to Vivid 7's Front-End System Test.

7-6-1-2 List of Service Tools Available via the Common Service Diagnostic Interface (GSUI)

Table 7-3 List of Service Tools Available via GSUI

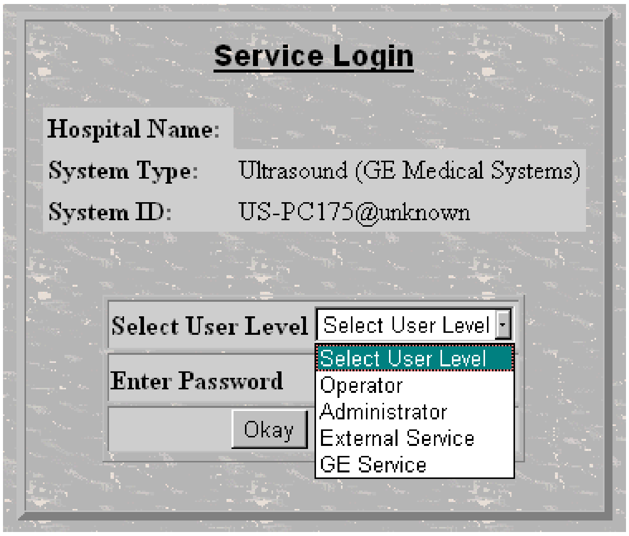
Software Tool	Description	Operator	Admin-istrator	External Service	Page Number
Error logs	Vivid 7 Error Logs	x	x	x	7-11
Diagnostics	Vivid 7 Diagnostics	x	x	x	7-26
Image Quality	[Not Populated]	-	-	-	7-32
Calibration	DC Offset Calibration	-	x	x	7-33
Configuration	[Not Populated]	-	-	-	7-35
Utilities	Vivid 7 Service Utilities	x	x	x	7-36
Replacement	[Not Populated]	-	-	-	7-46
PM	[Not Populated]	-	-	-	7-47

7-6-2 Common Service Diagnostic Interface (GSUI)

NOTE: *It is not necessary to connect a PC to Vivid 7 to use the GSUI.*

7-6-2-1 Log-in to GSUI

Double-click the button with the wrench icon ( ) in the status bar at the bottom of the video screen. This button links the user or the Field Engineer (FE) to the Service Login Screen.



Service Login

Hospital Name:
System Type: Ultrasound (GE Medical Systems)
System ID: US-PC175@unknown

Select User Level
Select User Level
Select User Level
Operator
Administrator
External Service
GE Service
Enter Password
Okay

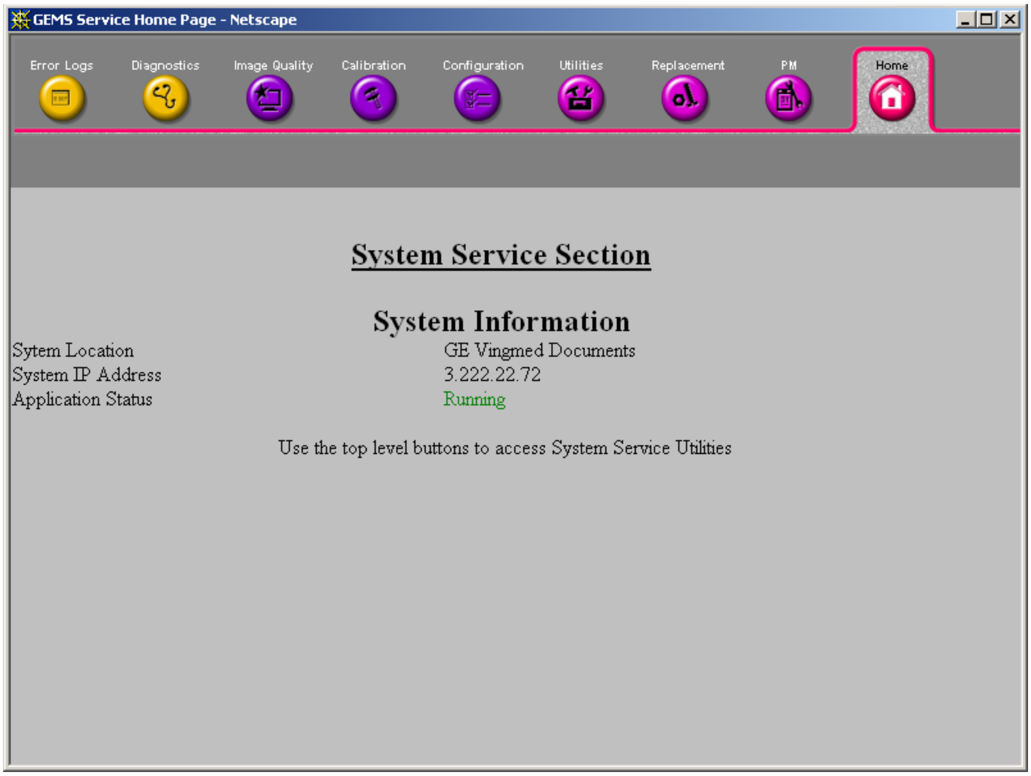
Figure 7-3 Service Login Screen

Log on as *External Service* with password: *gogems* (all lowercase letters).

7-6-3 Service Home Page

When the Common Service Desktop is started, the Service Home Page appears. The Home Page contains System Location, System IP Address and Application Status. The navigation bar at the top of the screen allows the user to select from several tools and applications.

NOTE: *When using the Common Service Desktop, do* ***NOT*** *iconify any of the Common Service Desktop windows. If you iconify them they end up in the lower left-hand corner of the screen behind the Service Desktop Manager window and cannot be restored.*


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home

System Service Section

System Information

Sytem Location	GE Vingmed Documents
System IP Address	3.222.22.72
Application Status	Running

Use the top level buttons to access System Service Utilities

Figure 7-4 Service Interface Home Page

7-6-3-1 Menu Bar Description

On top of the Service Interface Home Page, there is a menu bar where you can choose between several service related sheets, see Figure 7-5.

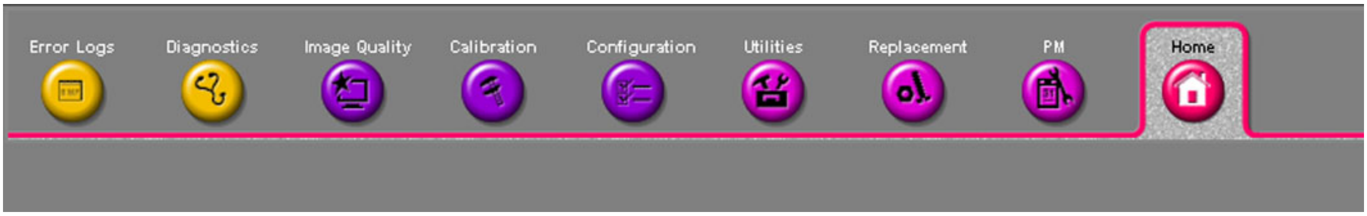

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home

Figure 7-5 Service Interface Home Page

The following choices are available on the manu bar:

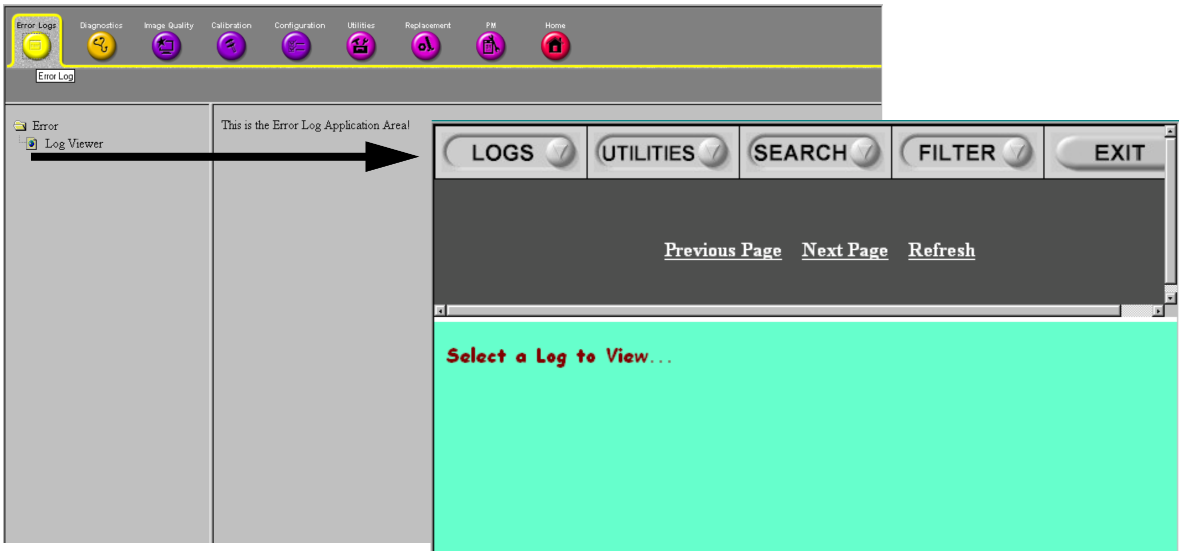
- Error Logs
- Diagnostics
- Image Quality
- Calibration
- Configuration
- Utilities
- Replacement
- PM
- Home

7-6-3-2 Description of Screens

Each screen may include one or more "sub-screens". The next subsections describes the different screens available.

7-6-4 Error Logs

From the **Error Logs** sheet, the **Log Viewer** displays four categories with pull-down sub-menus plus the **EXIT** button.


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Error Log
Error
Log Viewer
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

This is the Error Log Application Area!

Select a Log to View...

Figure 7-6 Error Log Viewer Menu

7-6-4-1 Logs

The **LOGS** pulldown menu has eight choices, as shown in Figure 7-7.

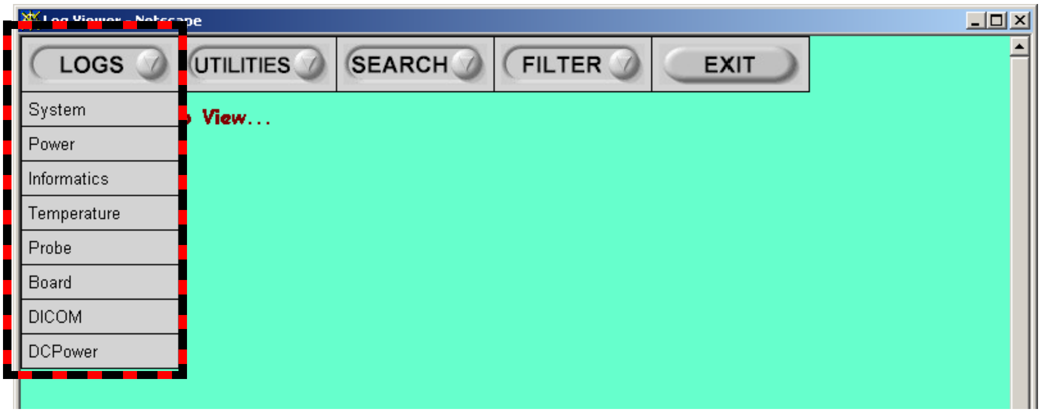

LOGS
UTILITIES
SEARCH
FILTER
EXIT
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower
View...

Figure 7-7 Logs Submenu

The choices are:

- System
- Power
- Informatics
- Temperature
- Probe
- Board
- DICOM
- DCPower

7-6-4-2 System

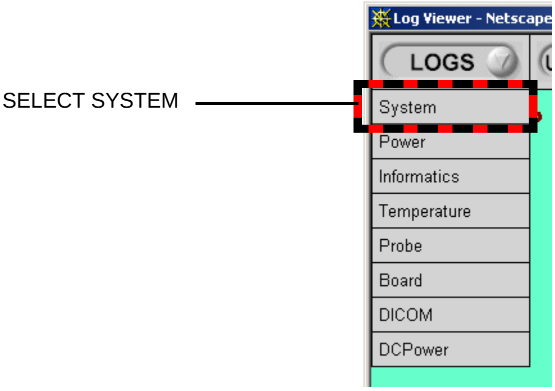
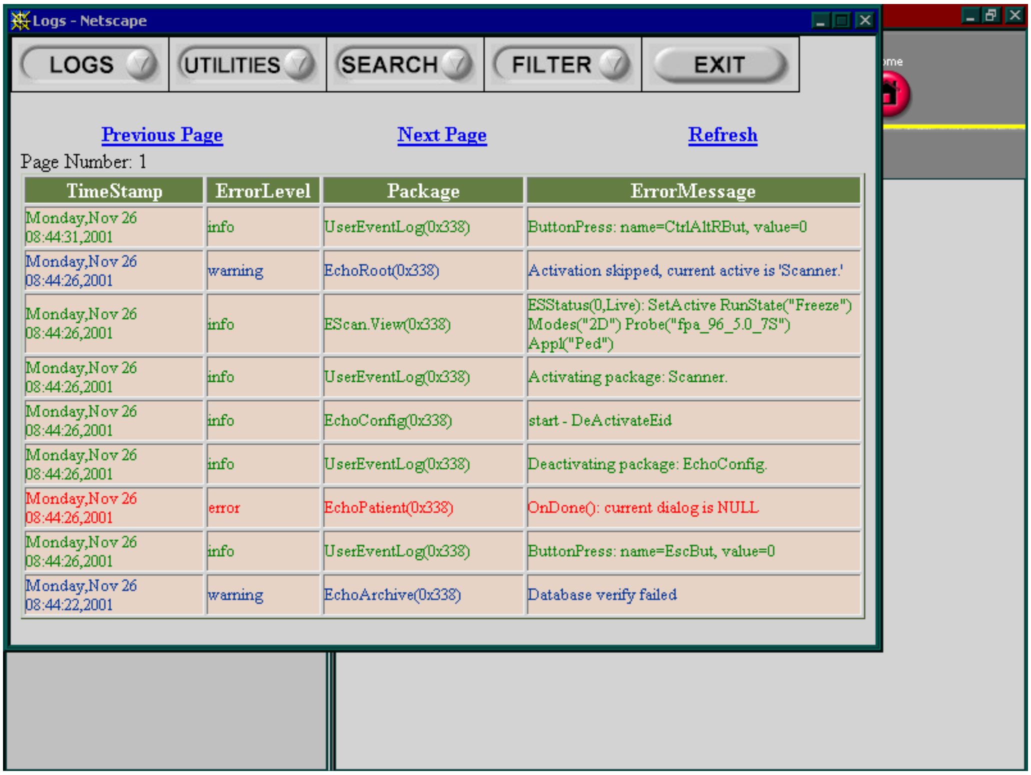

SELECT SYSTEM
Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower

Figure 7-8 Select System

Select **LOGS > System** to view the **System log**. It displays all error messages from Vivid 7.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

Page Number: 1

TimeStamp	ErrorLevel	Package	ErrorMessage
Monday,Nov 26 08:44:31,2001	info	UserEventLog(0x338)	ButtonPress: name=CtrlAltRBut, value=0
Monday,Nov 26 08:44:26,2001	warning	EchoRoot(0x338)	Activation skipped, current active is 'Scanner.'
Monday,Nov 26 08:44:26,2001	info	EScan.View(0x338)	ESStatus(0,Live): SetActive RunState("Freeze") Modes("2D") Probe("fpa_96_5.0_7S") Appl("Ped")
Monday,Nov 26 08:44:26,2001	info	UserEventLog(0x338)	Activating package: Scanner.
Monday,Nov 26 08:44:26,2001	info	EchoConfig(0x338)	start - DeActivateEid
Monday,Nov 26 08:44:26,2001	info	UserEventLog(0x338)	Deactivating package: EchoConfig.
Monday,Nov 26 08:44:26,2001	error	EchoPatient(0x338)	OnDone(): current dialog is NULL
Monday,Nov 26 08:44:26,2001	info	UserEventLog(0x338)	ButtonPress: name=EscBut, value=0
Monday,Nov 26 08:44:22,2001	warning	EchoArchive(0x338)	Database verify failed

Figure 7-9 Example of System Error Log

7-6-4-3 Power

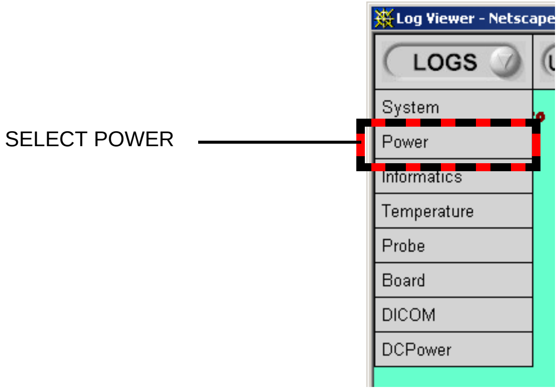
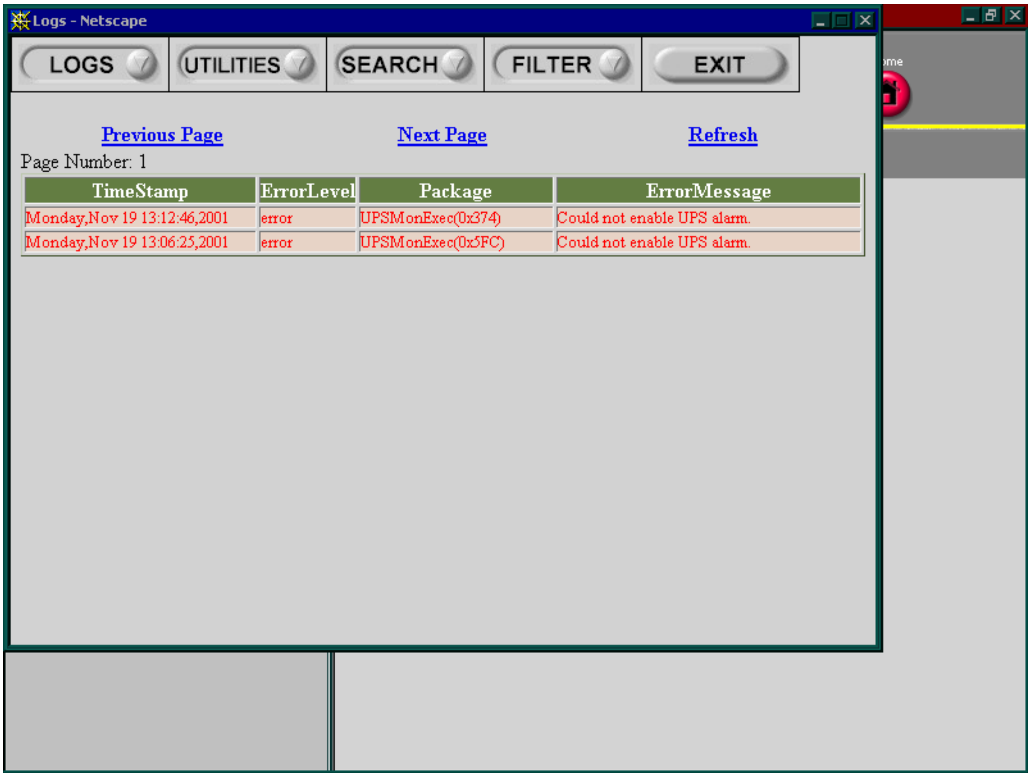

SELECT POWER
Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower

Figure 7-10 Select Power

Select **LOGS > Power** to view **Power log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

Page Number: 1

TimeStamp	ErrorLevel	Package	ErrorMessage
Monday,Nov 19 13:12:46,2001	error	UPSMonExec(0x374)	Could not enable UPS alarm.
Monday,Nov 19 13:06:25,2001	error	UPSMonExec(0x5FC)	Could not enable UPS alarm.

Figure 7-11 Example of Power Log

7-6-4-4 Informatics

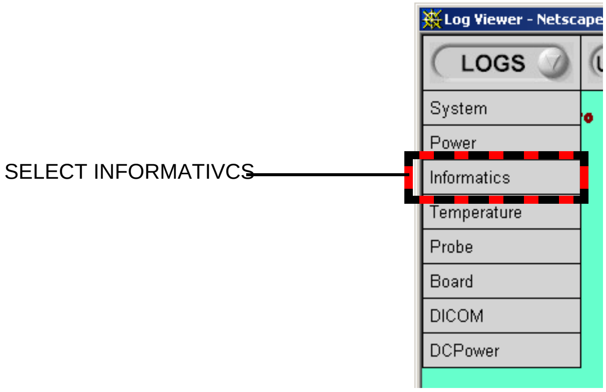
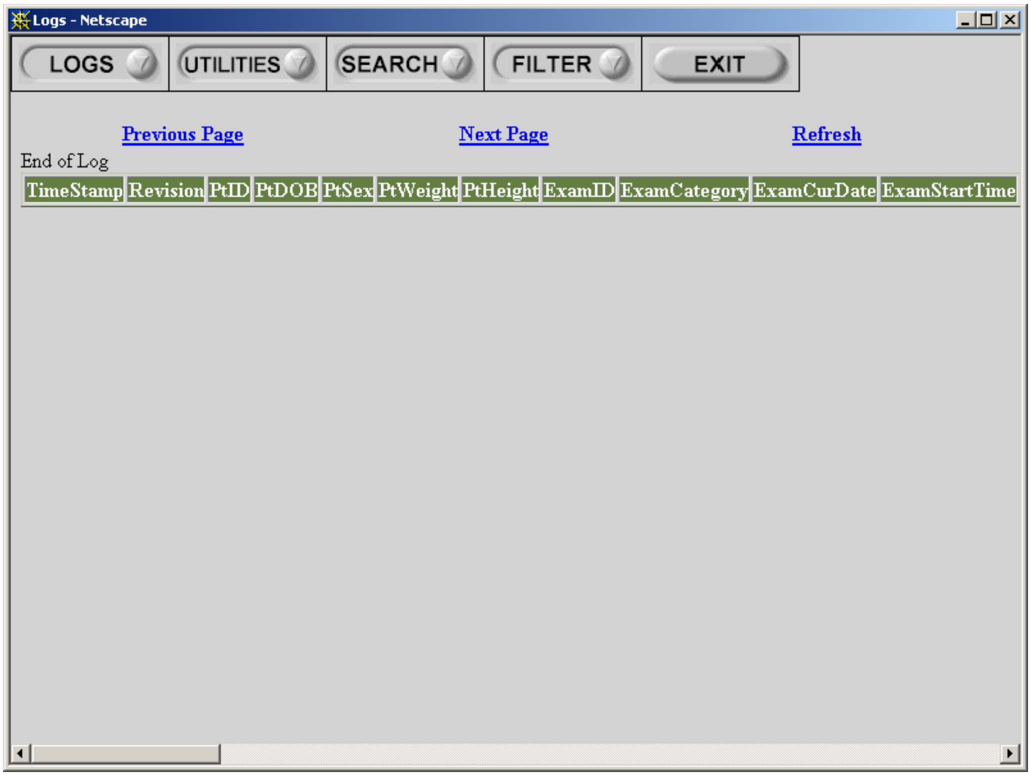

SELECT INFORMATIVCS
Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower

Figure 7-12 Select Informatics

Select **LOGS > Informatics** to view **Informatics log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

End of Log

TimeStamp	Revision	PtID	PtDOB	PtSex	PtWeight	PtHeight	ExamID	ExamCategory	ExamCurDate	ExamStartTime

Figure 7-13 Example of Informatics Log

7-6-4-5 Temperature

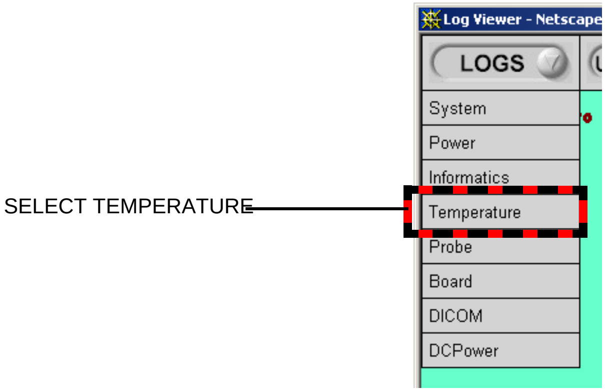
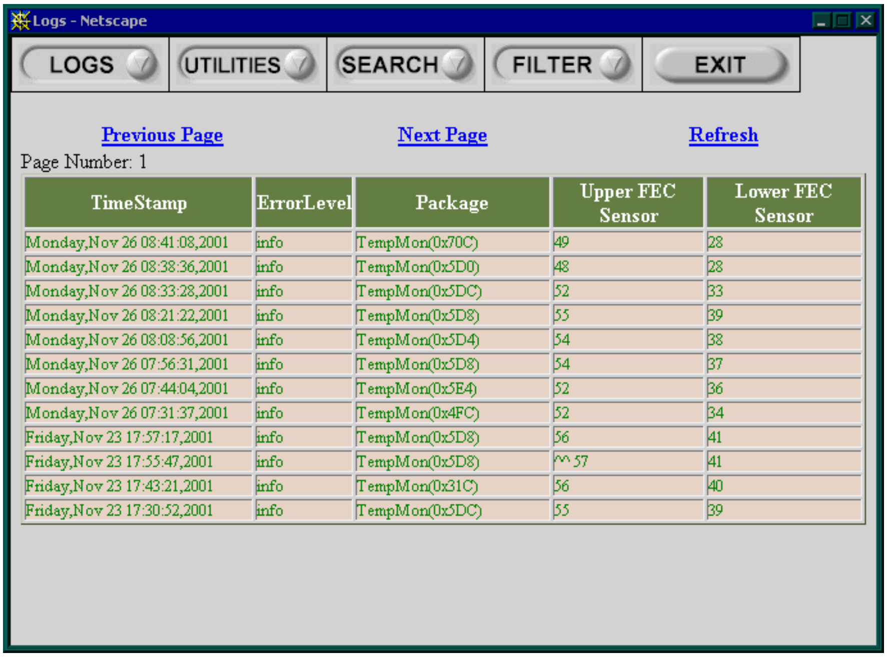

SELECT TEMPERATURE
Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower

Figure 7-14 Select Temperature

Select **LOGS > Temperature** to view **Temperature Log.**


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

Page Number: 1

TimeStamp	ErrorLevel	Package	Upper FEC Sensor	Lower FEC Sensor
Monday,Nov 26 08:41:08,2001	info	TempMon(0x70C)	49	28
Monday,Nov 26 08:38:36,2001	info	TempMon(0x5D0)	48	28
Monday,Nov 26 08:33:28,2001	info	TempMon(0x5DC)	52	33
Monday,Nov 26 08:21:22,2001	info	TempMon(0x5D8)	55	39
Monday,Nov 26 08:08:56,2001	info	TempMon(0x5D4)	54	38
Monday,Nov 26 07:56:31,2001	info	TempMon(0x5D8)	54	37
Monday,Nov 26 07:44:04,2001	info	TempMon(0x5E4)	52	36
Monday,Nov 26 07:31:37,2001	info	TempMon(0x4FC)	52	34
Friday,Nov 23 17:57:17,2001	info	TempMon(0x5D8)	56	41
Friday,Nov 23 17:55:47,2001	info	TempMon(0x5D8)	^^ 57	41
Friday,Nov 23 17:43:21,2001	info	TempMon(0x31C)	56	40
Friday,Nov 23 17:30:52,2001	info	TempMon(0x5DC)	55	39

Figure 7-15 Example of Temperature Log

7-6-4-6 Probe

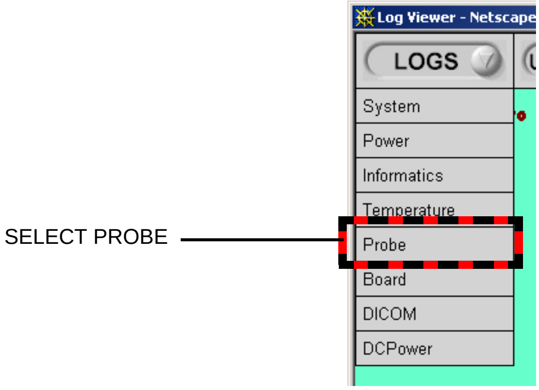
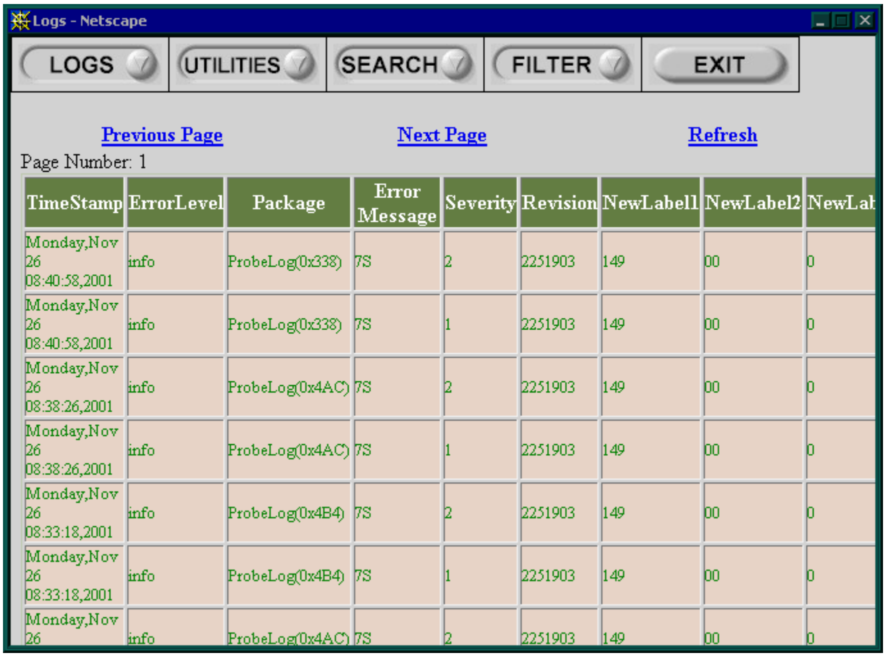

SELECT PROBE
Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower

Figure 7-16 Select Probe

Select **LOGS > Probe** to view **Probe Log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT

Previous Page Next Page Refresh

Page Number: 1

TimeStamp	ErrorLevel	Package	Error Message	Severity	Revision	NewLabel1	NewLabel2	NewLab
Monday,Nov 26 08:40:58,2001	info	ProbeLog(0x338)	7S	2	2251903	149	00	0
Monday,Nov 26 08:40:58,2001	info	ProbeLog(0x338)	7S	1	2251903	149	00	0
Monday,Nov 26 08:38:26,2001	info	ProbeLog(0x4AC)	7S	2	2251903	149	00	0
Monday,Nov 26 08:38:26,2001	info	ProbeLog(0x4AC)	7S	1	2251903	149	00	0
Monday,Nov 26 08:33:18,2001	info	ProbeLog(0x4B4)	7S	2	2251903	149	00	0
Monday,Nov 26 08:33:18,2001	info	ProbeLog(0x4B4)	7S	1	2251903	149	00	0
Monday,Nov 26	info	ProbeLog(0x4AC)	7S	2	2251903	149	00	0

Figure 7-17 Example of Probe Log

7-6-4-7 Board

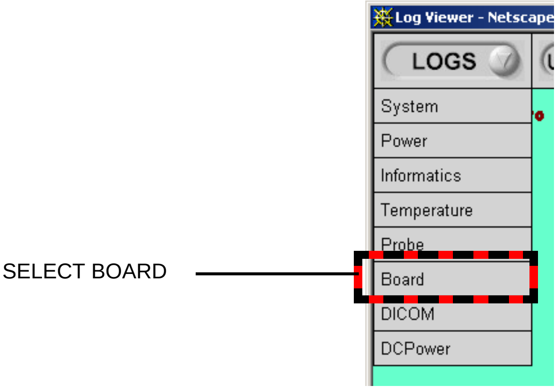
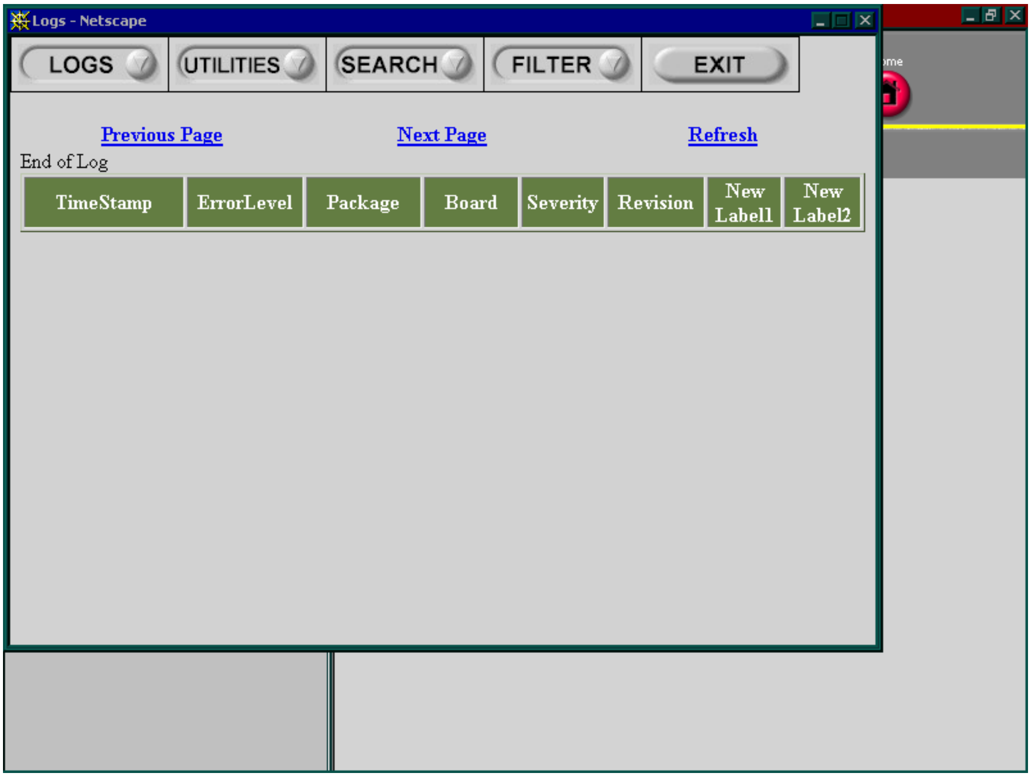

Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower
SELECT BOARD

Figure 7-18 Select Board

Select **LOGS > Board** to view **Board log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

End of Log

TimeStamp	ErrorLevel	Package	Board	Severity	Revision	New Label1	New Label2

Figure 7-19 Example of Board Log

7-6-4-8 DICOM

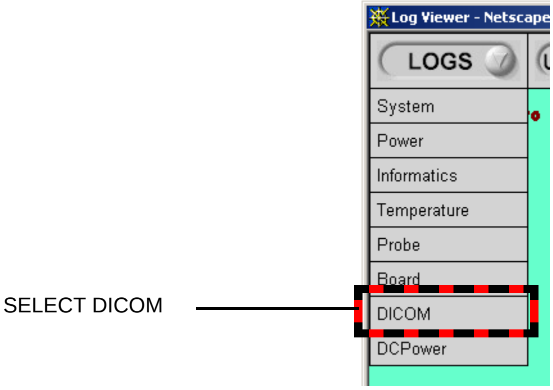
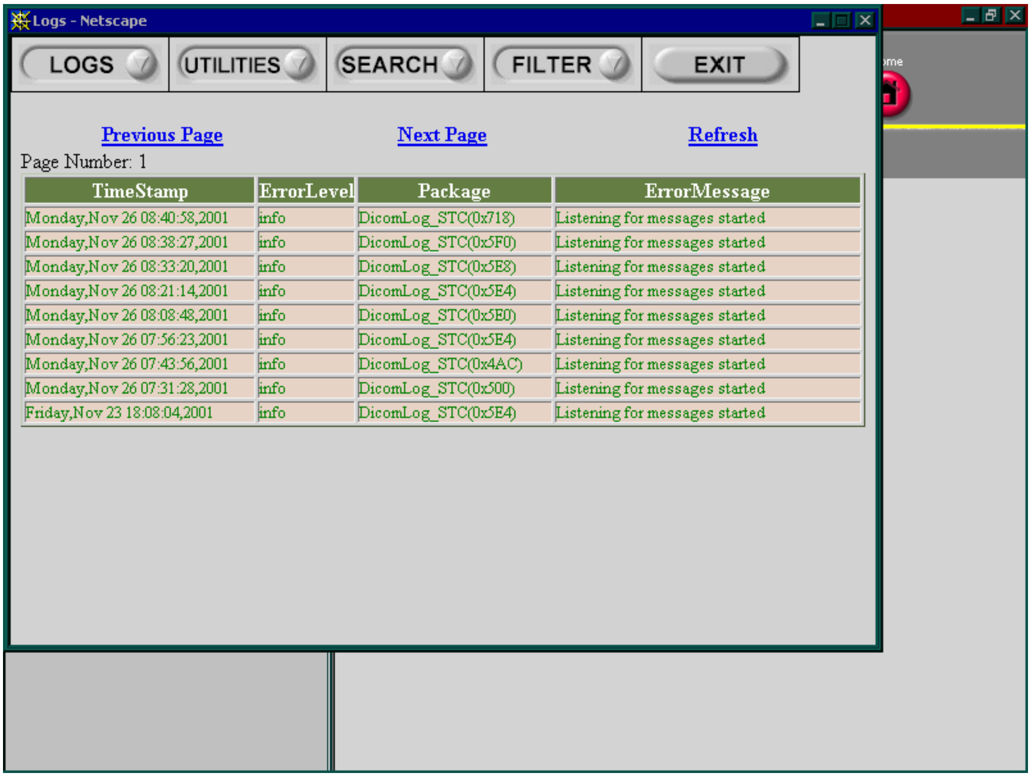

Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower
SELECT DICOM

Figure 7-20 Select DICOM

Select **LOGS > DICOM** to view the **DICOM log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

Page Number: 1

TimeStamp	ErrorLevel	Package	ErrorMessage
Monday,Nov 26 08:40:58,2001	info	DicomLog_STC(0x718)	Listening for messages started
Monday,Nov 26 08:38:27,2001	info	DicomLog_STC(0x5F0)	Listening for messages started
Monday,Nov 26 08:33:20,2001	info	DicomLog_STC(0x5E8)	Listening for messages started
Monday,Nov 26 08:21:14,2001	info	DicomLog_STC(0x5E4)	Listening for messages started
Monday,Nov 26 08:08:48,2001	info	DicomLog_STC(0x5E0)	Listening for messages started
Monday,Nov 26 07:56:23,2001	info	DicomLog_STC(0x5E4)	Listening for messages started
Monday,Nov 26 07:43:56,2001	info	DicomLog_STC(0x4AC)	Listening for messages started
Monday,Nov 26 07:31:28,2001	info	DicomLog_STC(0x500)	Listening for messages started
Friday,Nov 23 18:08:04,2001	info	DicomLog_STC(0x5E4)	Listening for messages started

Figure 7-21 Example of DICOM Log

7-6-4-9 DCPower

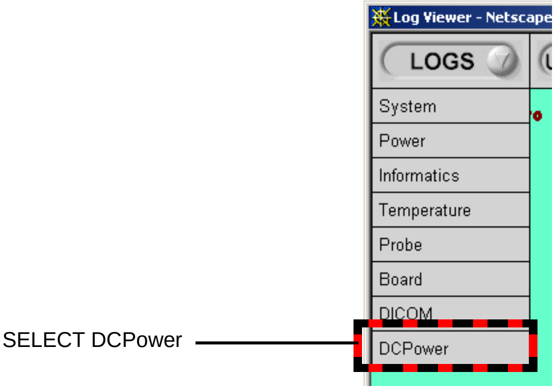
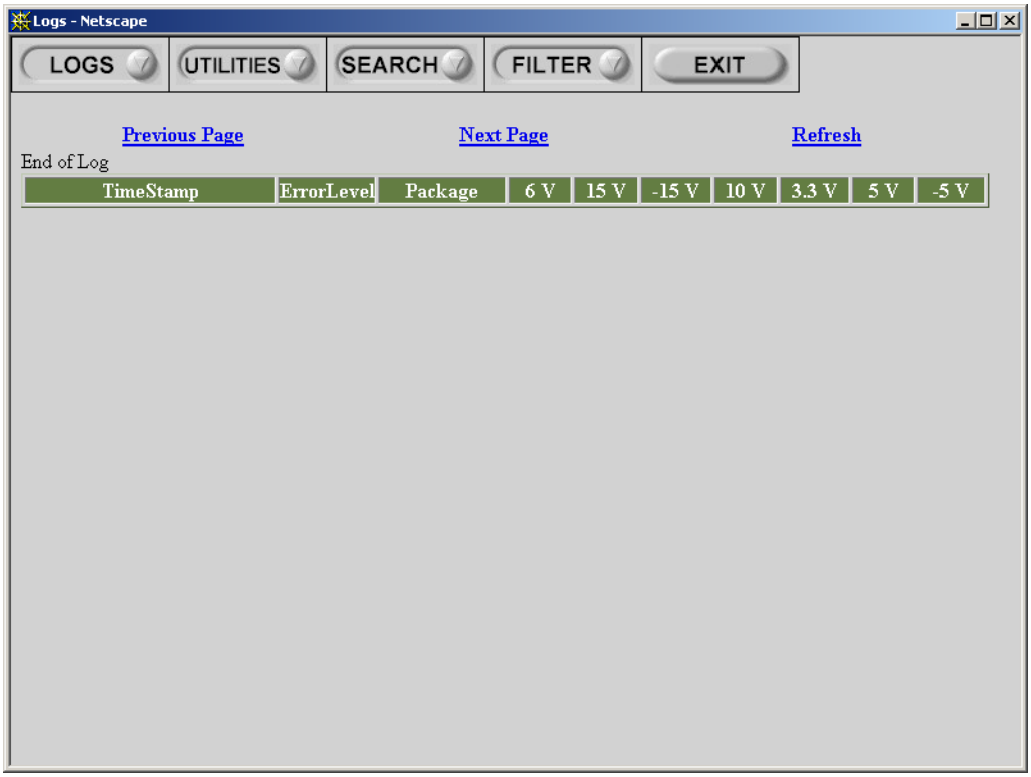

Log Viewer - Netscape
LOGS
System
Power
Informatics
Temperature
Probe
Board
DICOM
DCPower
SELECT DCPower

Figure 7-22 Select DCPower

Select **LOGS > DCPower** to view the **DCPower Log**.


Logs - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Previous Page
Next Page
Refresh

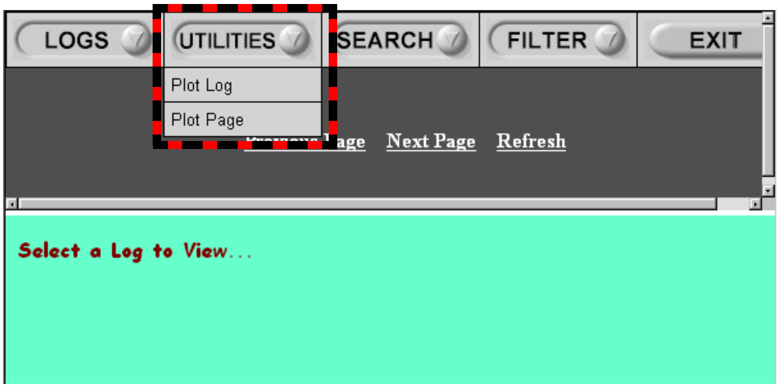
End of Log

TimeStamp	ErrorLevel	Package	6 V	15 V	-15 V	10 V	3.3 V	5 V	-5 V

Figure 7-23 Example of DC Power Log Screen

7-6-4-10 Utilities

The **UTILITIES** pulldown menu has two choices, as shown in Figure 7-24.


LOGS
UTILITIES
SEARCH
FILTER
EXIT
Plot Log
Plot Page
Previous Page
Next Page
Refresh

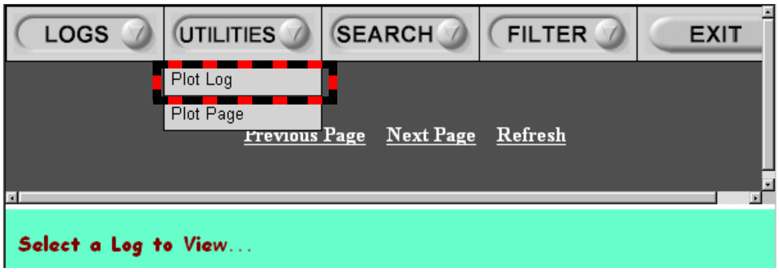
Select a Log to View...

Figure 7-24 Utilities Category

The choices on the **UTILITIES** pulldown menu are:

- Plot Log (see: 7-6-4-11 "Plot Log" on page 7-22)
- Plot Page (see: 7-6-4-12 "Plot Page" on page 7-23)

7-6-4-11 Plot Log


LOGS
UTILITIES
SEARCH
FILTER
EXIT
Plot Log
Plot Page
Previous Page
Next Page
Refresh

Select a Log to View...

Figure 7-25 Utilities Category

Select **UTILITIES > Plot Log** to make a plot of the active log on the screen.

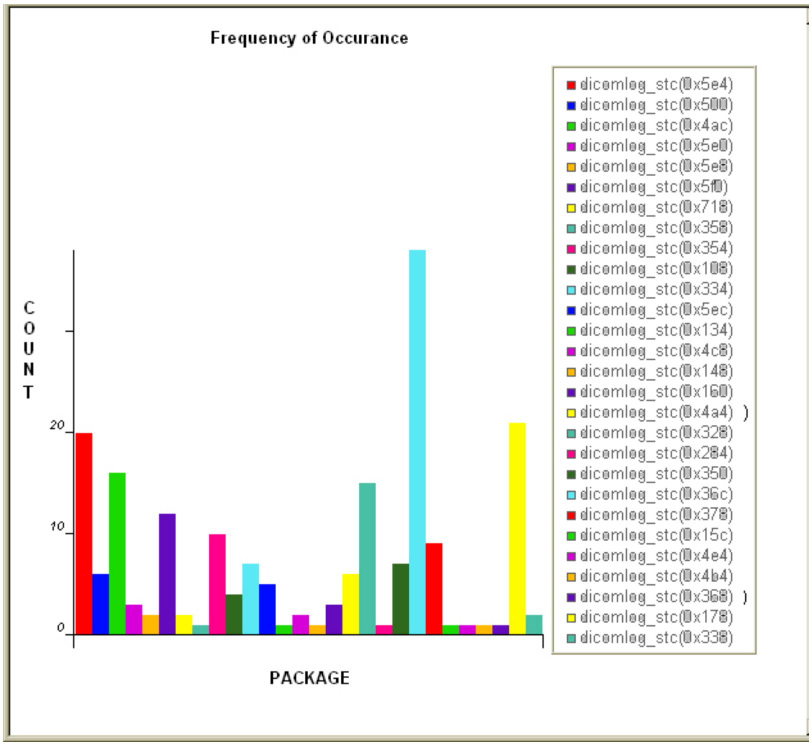
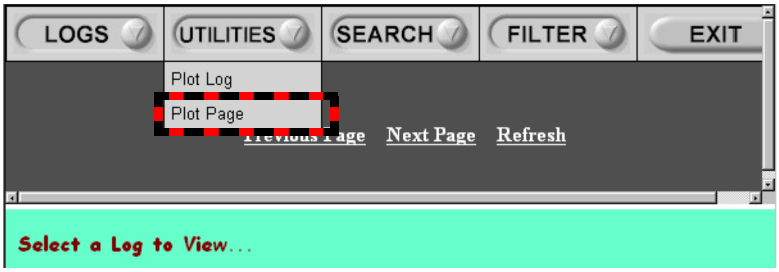


Figure 7-26 Utilities, Plot Log (example)

7-6-4-12 Plot Page


LOGS
UTILITIES
SEARCH
FILTER
EXIT
Plot Log
Plot Page
Previous Page
Next Page
Refresh

Select a Log to View...

Figure 7-27 Utilities Category

Select **UTILITIES > Plot Page** to make a plot of the active (log-) page on screen.

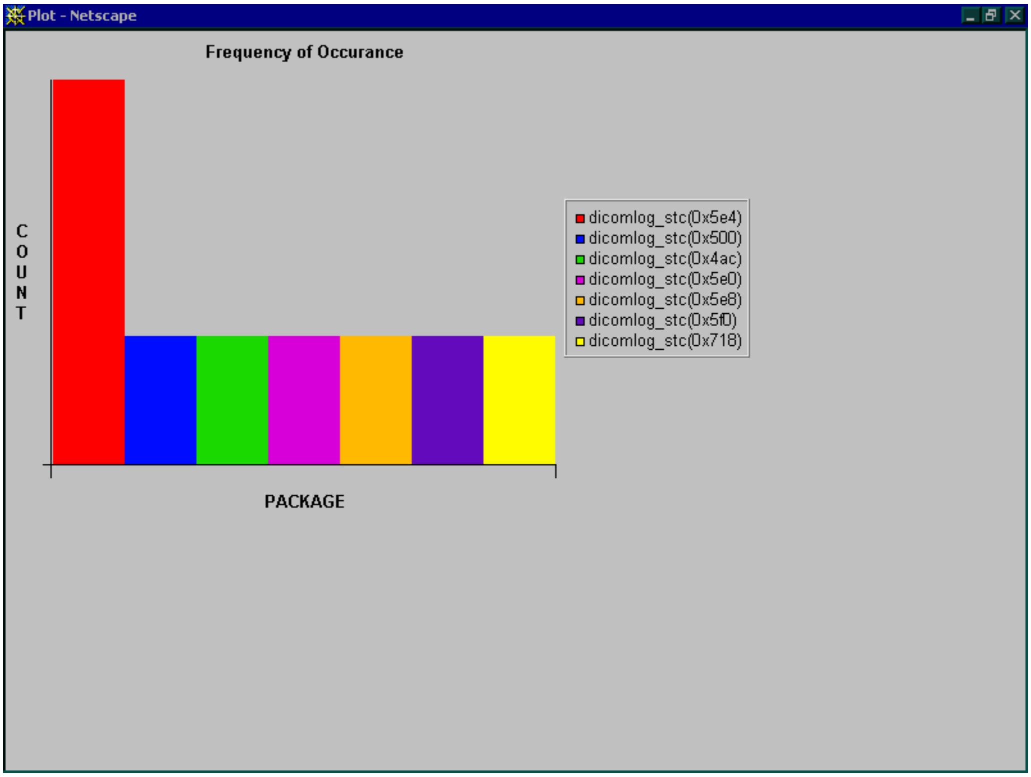

Plot - Netscape
Frequency of Occurance
COUNT
PACKAGE
dicomlog_stc(0x5e4)
dicomlog_stc(0x500)
dicomlog_stc(0x4ac)
dicomlog_stc(0x5e0)
dicomlog_stc(0x5e8)
dicomlog_stc(0x5f0)
dicomlog_stc(0x718)

Figure 7-28 Utilities, Plot Page (example)

7-6-4-13 Search

On the Text Search sub-menu of the Search category, users enter case-sensitive text they wish to search for in the logs.

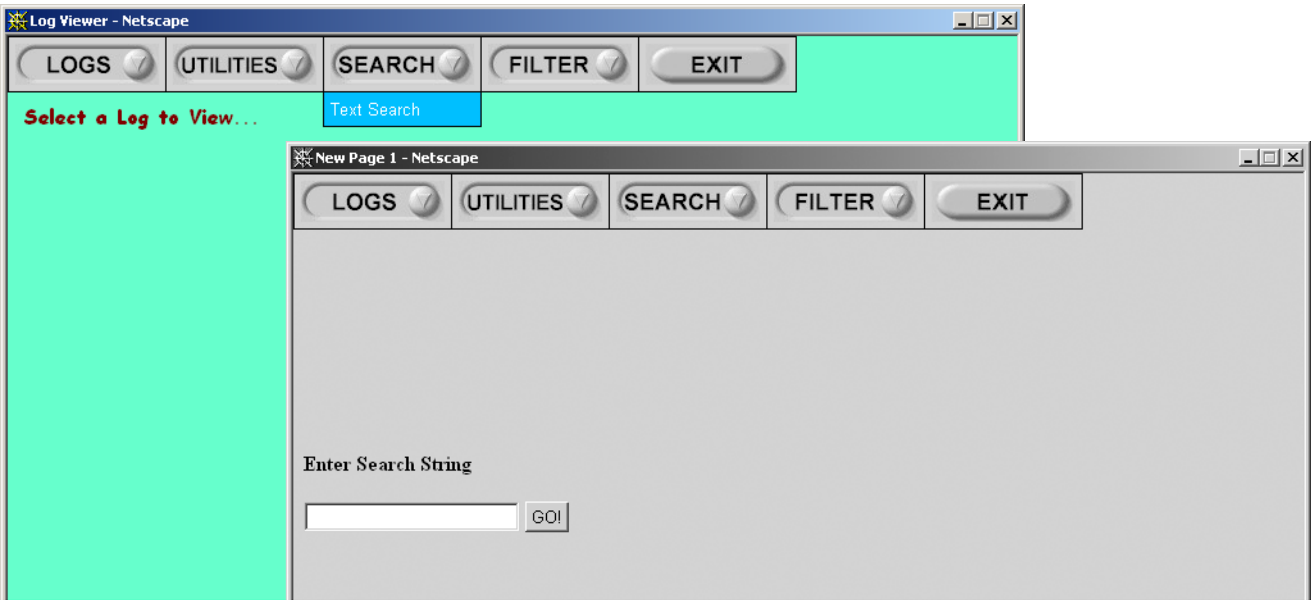

Log Viewer - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Text Search
Select a Log to View...
New Page 1 - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Enter Search String
GO!

Figure 7-29 Search Category

7-6-4-14 Filter

This function is available for GE Service only.

7-6-4-15 Exit

The sub-menu, Exit Log Viewer, returns the user to the Common Service Desktop Home Page.

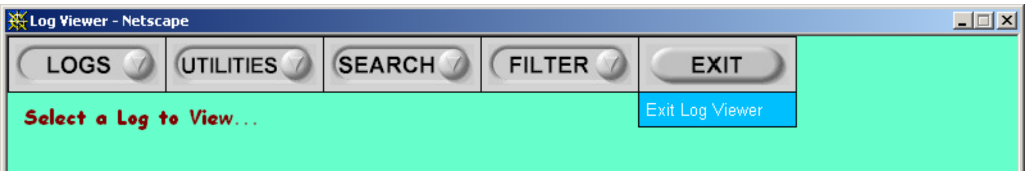
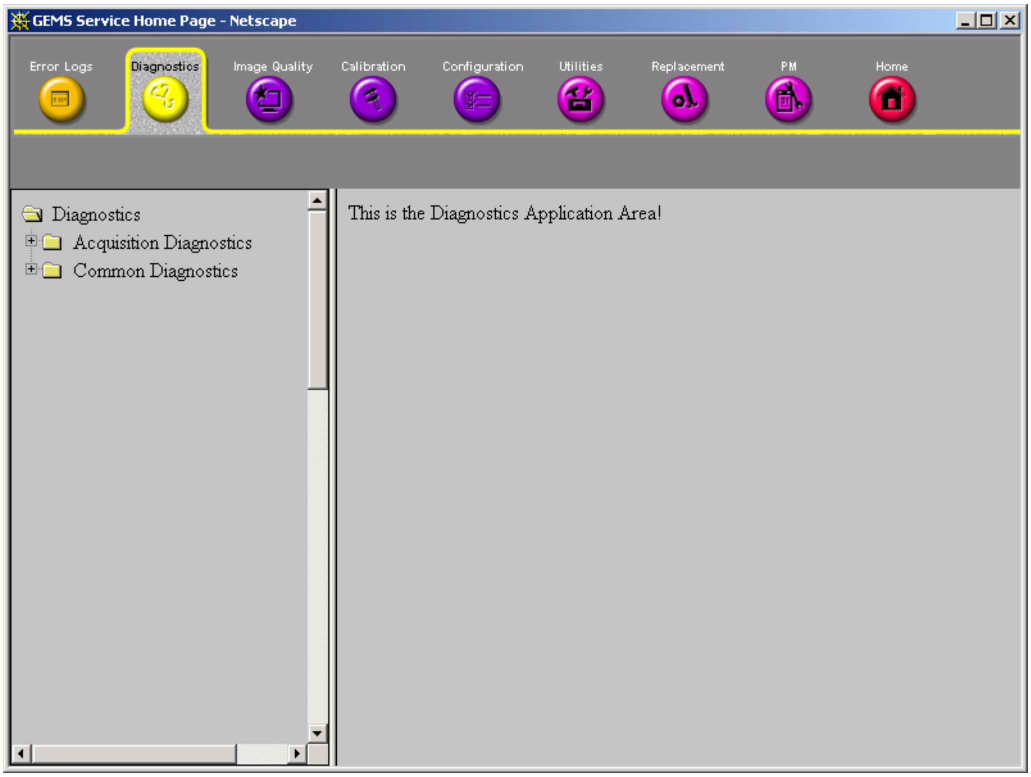

Log Viewer - Netscape
LOGS
UTILITIES
SEARCH
FILTER
EXIT
Exit Log Viewer
Select a Log to View...

Figure 7-30   Exit Log Viewer Category

7-6-5 Diagnostics Screen Overview

When the Diagnostics Screen has been selected, two main tools are available:

- Acquisition Diagnostics, see 7-6-5-1 "GSUI Acquisition Diagnostics - Test All" on page 7-27.
- Common Diagnostics, see Section 7-7 "Common Diagnostics" on page 7-48.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Common Diagnostics

This is the Diagnostics Application Area!

Figure 7-31 Diagnostics Screen Home Page

7-6-5-1 GSUI Acquisition Diagnostics - Test All

One test is available, *Test All.*

NOTE: Disconnect all probes before running this test.

Test All runs a sequential test as listed below.

NOTE: Relay Board (RLB) and Chain are not tested in this test. Some parts of the Transmitter (TX) Board are tested during the FEC Board test, but other parts of the TX Board aren't tested at all.

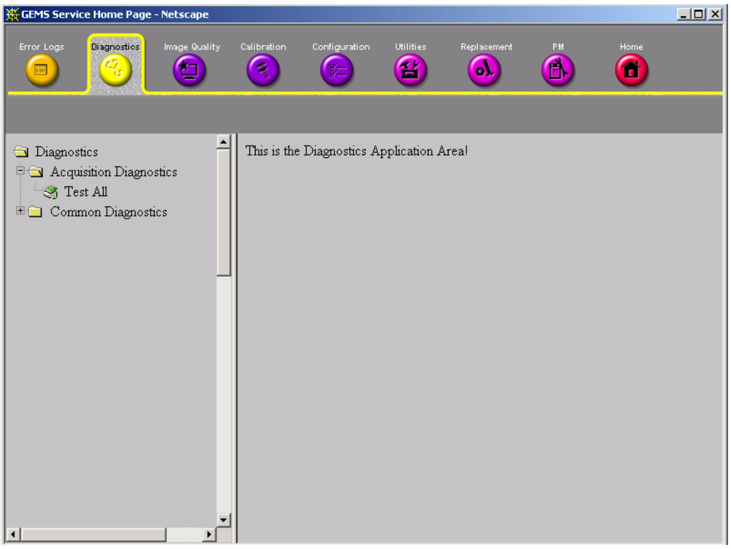
A.) Units with FEP1:

1.) PC2IP
2.) IMP (Image Port Board)
3.) VME (VME data bus on the Back Plane)
4.) SDP (Spectrum Doppler Processor)
5.) RFT (Radio Frequency & Tissue Board)
6.) FEC (Front-End Controller Board) (Some parts of TX board is also tested)
7.) BF (Beamformer Boards)
8.) RX (Receiver Board)
9.) TXP (TX Power)

B.) Units with FEP2:

1.) PC2IP
2.) RFI (Radio Frequency Interface Board)
3.) BF (Beamformer Boards)
4.) RX (Receiver Board)
5.) TXP (TX Power)

7-6-5-1 GSUI Acquisition Diagnostics - Test All (cont'd)


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Test All
Common Diagnostics

This is the Diagnostics Application Area!

Figure 7-32 User Interface Diagnostic Screen, Test All

7-6-5-2 Instructions Frame

Displays a test-specific page or the default instructions page.

7-6-5-3 Status Frame

Initially displays the last known status for the particular diagnostic. Once the diagnostic starts, the frame displays the “current” status of all test results.

7-6-5-4 Control Frame

Contains the user interface elements used for:

- Diagnostic control
- Operator feedback

a.) Execute Button

This button has two modes - each with appropriate text:

* Execute - to start the diagnostic, and

* Abort - to stop a diagnostic

b.) Loop Count

This is an editable text field that will only accept numeric values with 4 digits or less. When the button described in *Execute Button step* a (above) is configured as an “execute” button and pressed, the loop count field will be queried to determine the number of times to execute the diagnostic.

c.) Progress Indicator

Displays a graphical progress indicator for the user.

d.) Short Text Message

Displays either a starting message or aborting message, as well as the diagnostic completion status.

e.) Control Frame Background Color

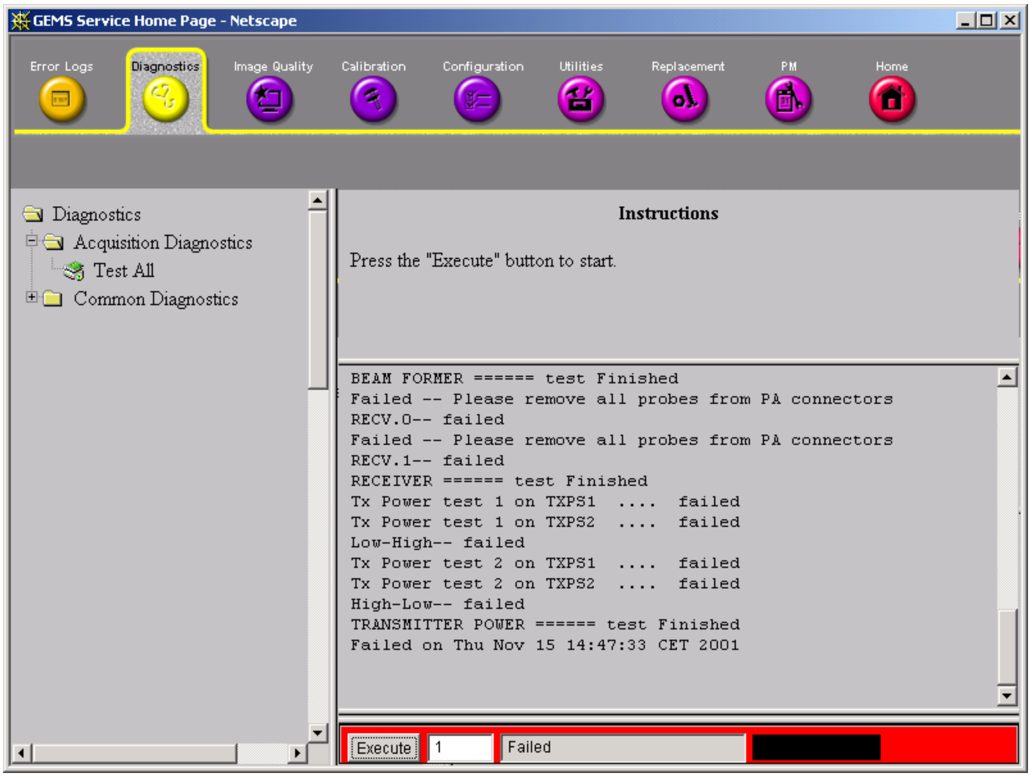
Initially gray, the Control Frame background color changes upon completion of a diagnostic to indicate completion status.

* Fail = Red

* Pass = Green

7-6-5-4 Control Frame (cont'd)

Examine the log in the status frame to find the test(s) that failed. (In the example in Figure 7-33, all the tests failed.)


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Test All
Common Diagnostics
Instructions
Execute

Press the "Execute" button to start.

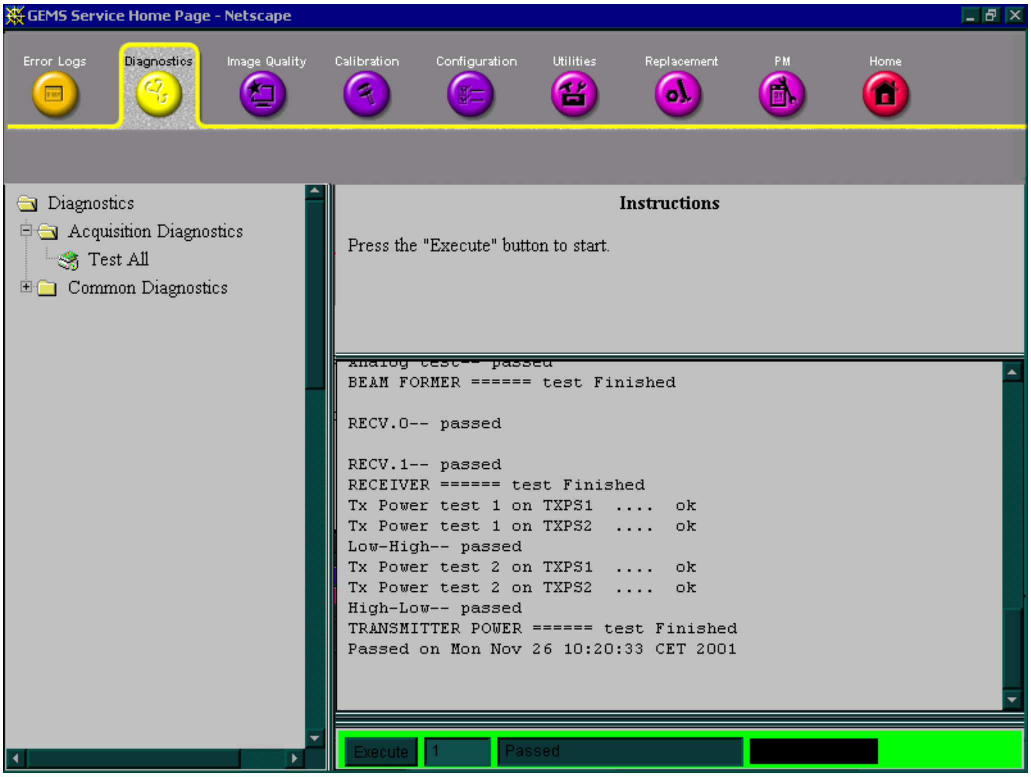
```
BEAM FORMER ====== test Finished
Failed -- Please remove all probes from PA connectors
RECV.0-- failed
Failed -- Please remove all probes from PA connectors
RECV.1-- failed
RECEIVER ====== test Finished
Tx Power test 1 on TXPS1  ....  failed
Tx Power test 1 on TXPS2  ....  failed
Low-High-- failed
Tx Power test 2 on TXPS1  ....  failed
Tx Power test 2 on TXPS2  ....  failed
High-Low-- failed
TRANSMITTER POWER ====== test Finished
Failed on Thu Nov 15 14:47:33 CET 2001
```

1 Failed

Figure 7-33 User Interface Diagnostic Screen, *Test All* Failed

7-6-5-4 Control Frame (cont'd)

In Figure 7-34, the test passed. The green background color in the Control Frame indicates that the test passed.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Test All
Common Diagnostics
Execute
1

Instructions

Press the "Execute" button to start.

```
Analog test-- passed
BEAM FORMER ====== test Finished

RECV.0-- passed

RECV.1-- passed
RECEIVER ====== test Finished
Tx Power test 1 on TXPS1  ....  ok
Tx Power test 1 on TXPS2  ....  ok
Low-High-- passed
Tx Power test 2 on TXPS1  ....  ok
Tx Power test 2 on TXPS2  ....  ok
High-Low-- passed
TRANSMITTER POWER ====== test Finished
Passed on Mon Nov 26 10:20:33 CET 2001
```

Passed

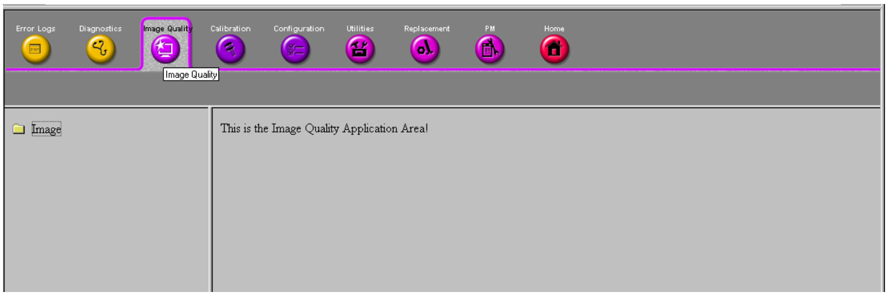
Figure 7-34 User Interface Diagnostic Screen, *Test All* Passed

7-6-5-5 Common Diagnostics

See: Section 7-7 "Common Diagnostics" on page 7-48.

7-6-6 Image Quality

Field is not populated.


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Image Quality
Image

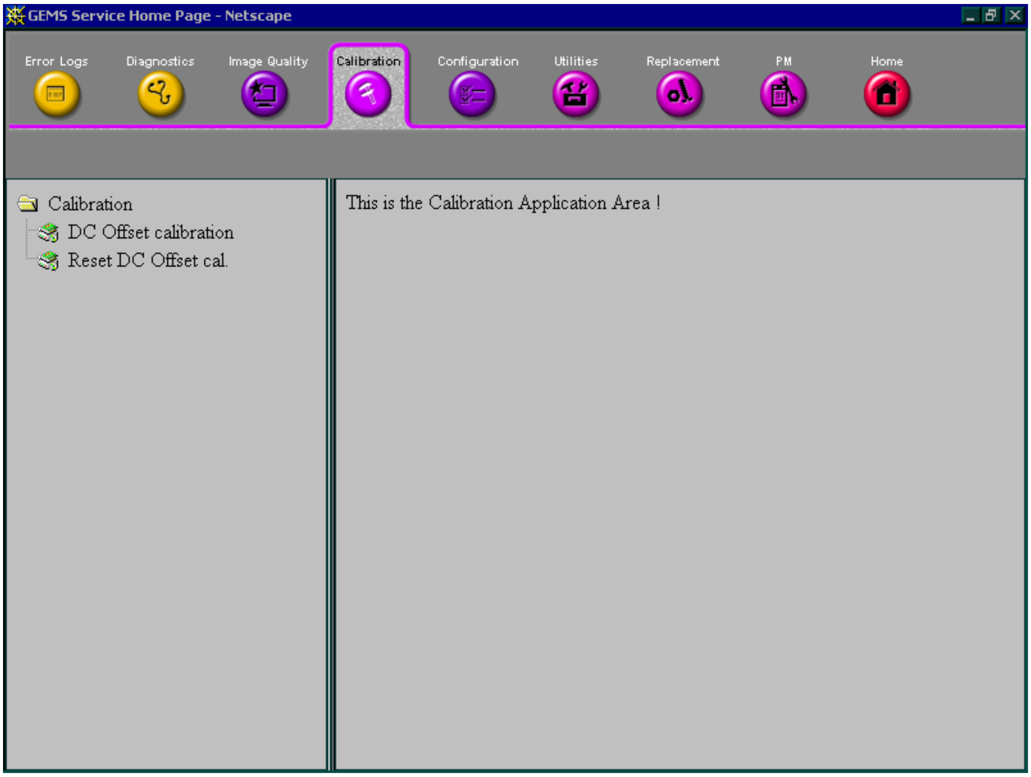
This is the Image Quality Application Area!

Figure 7-35 Image Quality Page

7-6-7 Calibration

This screen gives you access to:

- DC Offset calibration
- Reset DC-Offset cal (calibration)


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Calibration
DC Offset calibration
Reset DC Offset cal.

This is the Calibration Application Area !

Figure 7-36 Calibration

7-6-7-1 DC Offset Calibration

DC Offset calibration also called “Beamformer Calibration” or “Front-End Alignment” is performed to calibrate each ADC channel of the two Beamformer (BF) board inputs. The system calibrates the Beamformer ADCs to zero output when there is no signal on the input.

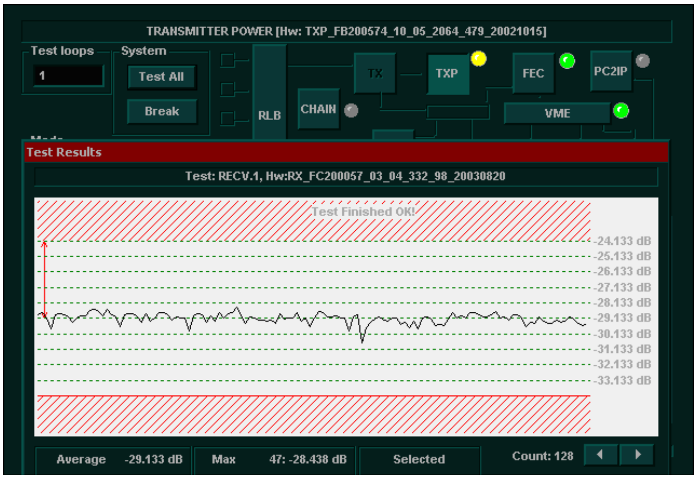
These bias voltages are stored on hard disk in Back-End Processor.

You can either access **DC Offset Calibration** via the screen displayed above, or as described in Section 6-7 "Front-End Alignment Procedure (Beamformer Calibration)" on page 6-6.

The user interfaces are different, but they use the same adjustment software, so the result from the two access methodes are equal.

1.) Select DC Offset Calibration
2.) Wait for the calibration to take place.
3.) When finished, select Show Graph.

NOTE: Wavy line signifies system has been calibrated. A Straight line signifies that the system has not been calibrated and can be the cause of image quality issues.


TRANSMITTER POWER [Hw: TXP_FB200574_10_05_2064_479_20021015]

Test loops: 1

Test Results

Test: RECV.1, Hw:RX_FC200057_03_04_332_98_20030820

Test Finished OK!

Average -29.133 dB

Max 47: -28.438 dB

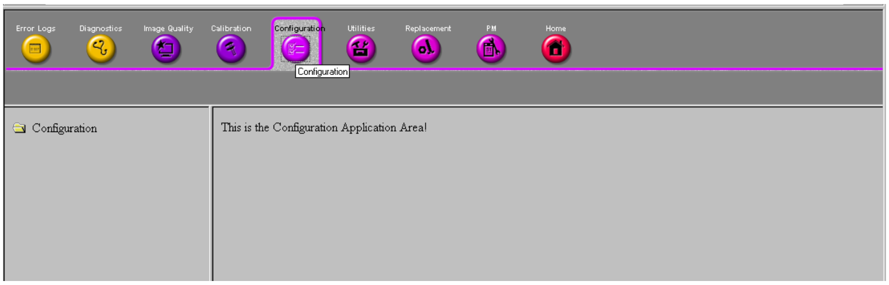
Count: 128

Figure 7-37 DC Calibration of the Beamformer AD-converters Passed

NOTE: The LEDs displayed in the below individual board sections are relevant when the system is in the default setting (2D-mode).

7-6-8 Configuration

Use the Configuration Screen to add or edit Software Options Strings, alphanumeric strings to enable Software Options (the password(s) used for enabling optional functions).


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Configuration
Configuration

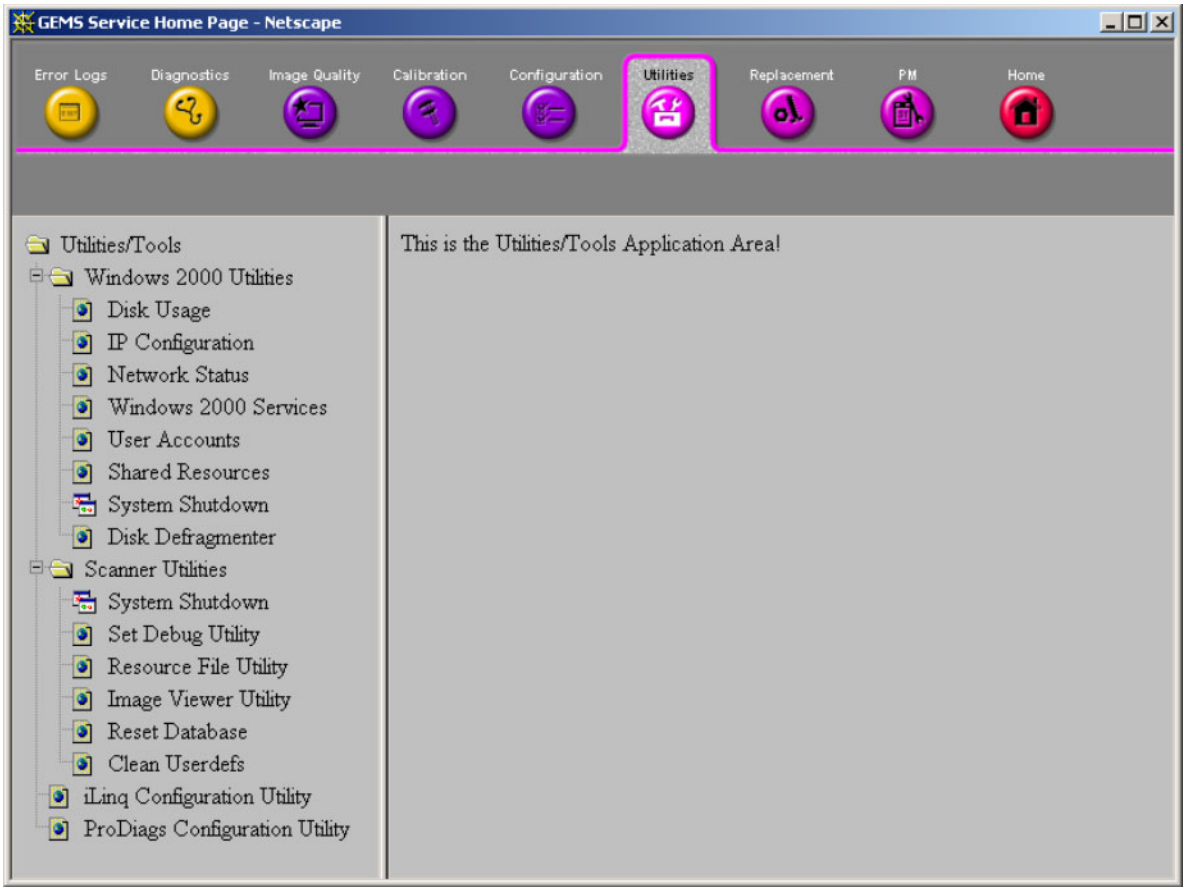
This is the Configuration Application Area!

Figure 7-38 Configuration Page

7-6-9 Utilities

The Utilities page contains several miscellaneous tools:

- **Windows 2000 Utilities**
  - Disk Usage
  - IP Configuration
  - Network Status
  - Windows 2000 Services
  - User Accounts
  - Shared Resources
  - System Shutdown
  - Disk Defragmenter
- **Scanner Utilities**
  - System Shutdown
  - Set Debug Utility
  - Reset Database
  - Clean Userdefs
  - Resource File Utility
- **iLink Configuration Utility**
- **ProDiags Configuration Utility**


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Disk Defragmenter
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility
Image Viewer Utility
Reset Database
Clean Userdefs
iLinq Configuration Utility
ProDiags Configuration Utility

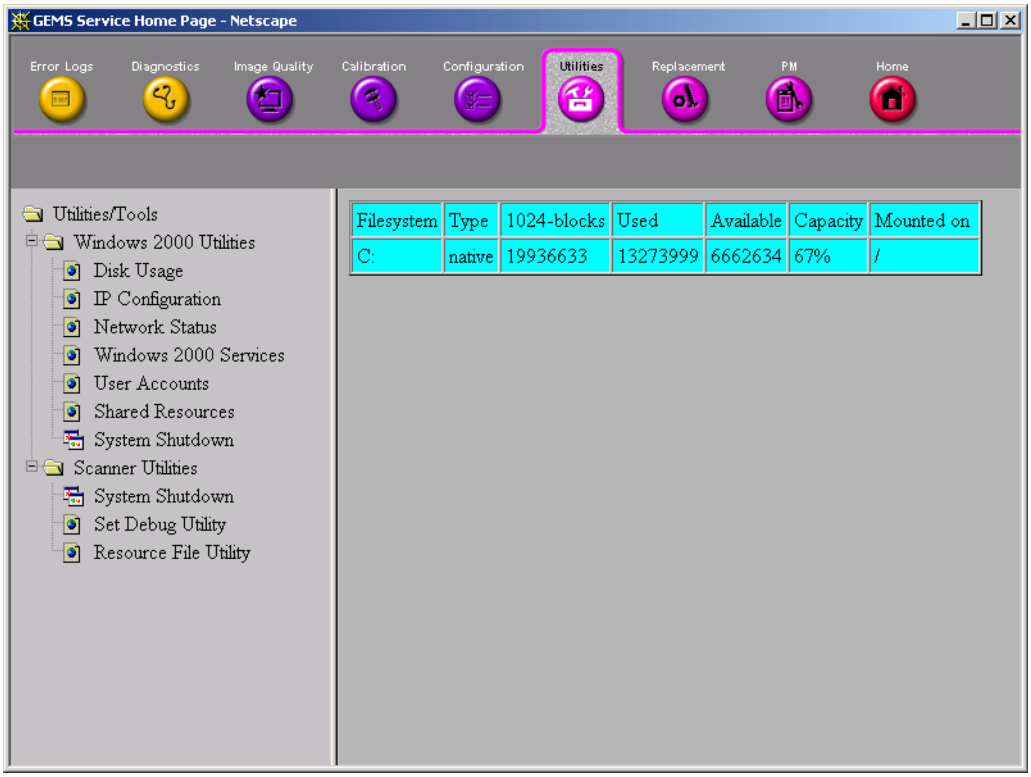
This is the Utilities/Tools Application Area!

Figure 7-39 Utilities/Tools Page (example)

7-6-9-1 Windows 2000 Utilities

Disk Usage

The Disk Usage page displays an overview of Vivid 7’s disk usage.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

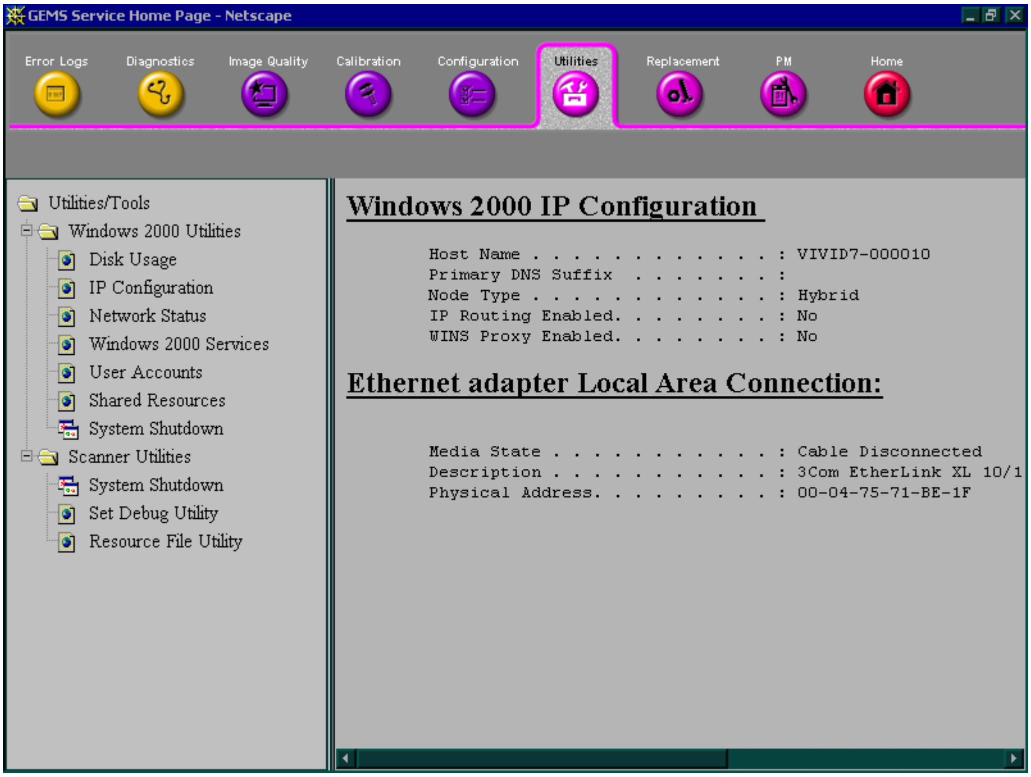
Filesystem	Type	1024-blocks	Used	Available	Capacity	Mounted on
C:	native	19936633	13273999	6662634	67%	/

Figure 7-40 Disk Usage

7-6-9-1 Windows 2000 Utilities (cont'd)

IP Configuration

The IP Configuration page gives you an overview of Vivid 7's Internet Protocol (IP) configuration.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

Windows 2000 IP Configuration

```
Host Name . . . . . . . . . . . . : VIVID7-000010
Primary DNS Suffix  . . . . . . . :
Node Type . . . . . . . . . . . . : Hybrid
IP Routing Enabled. . . . . . . . : No
WINS Proxy Enabled. . . . . . . . : No
```

Ethernet adapter Local Area Connection:

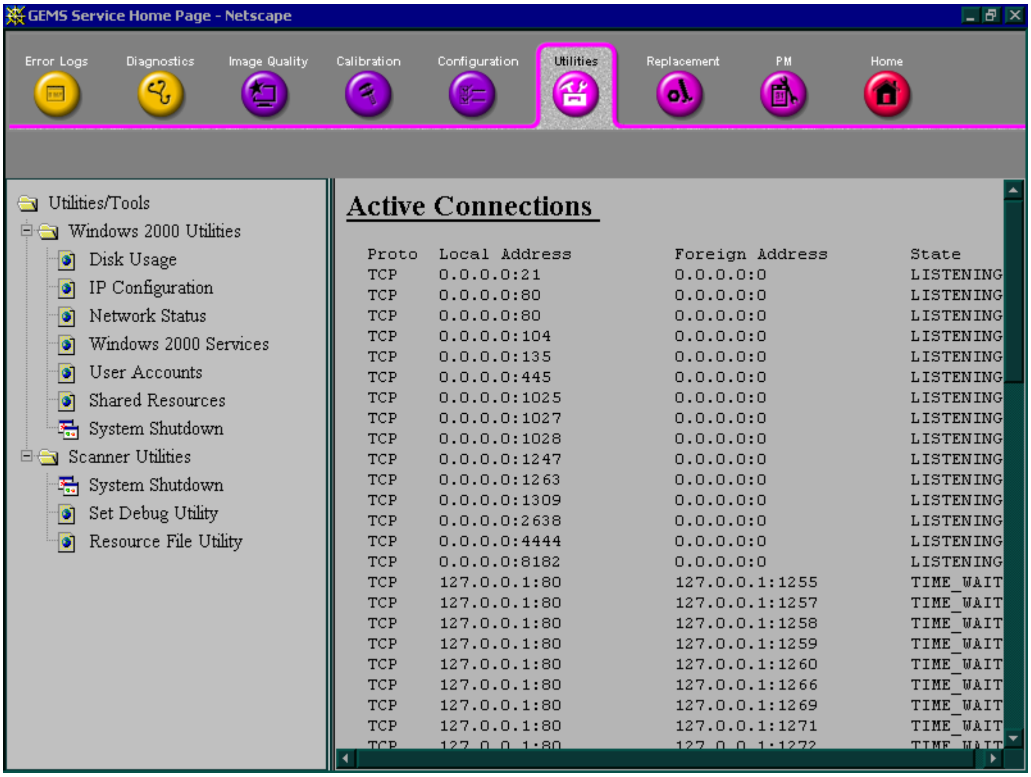
```
Media State . . . . . . . . . . . : Cable Disconnected
Description . . . . . . . . . . . : 3Com EtherLink XL 10/1
Physical Address. . . . . . . . . : 00-04-75-71-BE-1F
```

Figure 7-41 IP Configuration

7-6-9-1 Windows 2000 Utilities (cont'd)

Network Status

This screen displays all open TCP/IP Ports on Vivid 7.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

Active Connections

```
Proto  Local Address          Foreign Address        State
TCP    0.0.0.0:21             0.0.0.0:0              LISTENING
TCP    0.0.0.0:80             0.0.0.0:0              LISTENING
TCP    0.0.0.0:80             0.0.0.0:0              LISTENING
TCP    0.0.0.0:104            0.0.0.0:0              LISTENING
TCP    0.0.0.0:135            0.0.0.0:0              LISTENING
TCP    0.0.0.0:445            0.0.0.0:0              LISTENING
TCP    0.0.0.0:1025           0.0.0.0:0              LISTENING
TCP    0.0.0.0:1027           0.0.0.0:0              LISTENING
TCP    0.0.0.0:1028           0.0.0.0:0              LISTENING
TCP    0.0.0.0:1247           0.0.0.0:0              LISTENING
TCP    0.0.0.0:1263           0.0.0.0:0              LISTENING
TCP    0.0.0.0:1309           0.0.0.0:0              LISTENING
TCP    0.0.0.0:2638           0.0.0.0:0              LISTENING
TCP    0.0.0.0:4444           0.0.0.0:0              LISTENING
TCP    0.0.0.0:8182           0.0.0.0:0              LISTENING
TCP    127.0.0.1:80           127.0.0.1:1255         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1257         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1258         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1259         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1260         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1266         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1269         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1271         TIME_WAIT
TCP    127.0.0.1:80           127.0.0.1:1272         TIME_WAIT
```

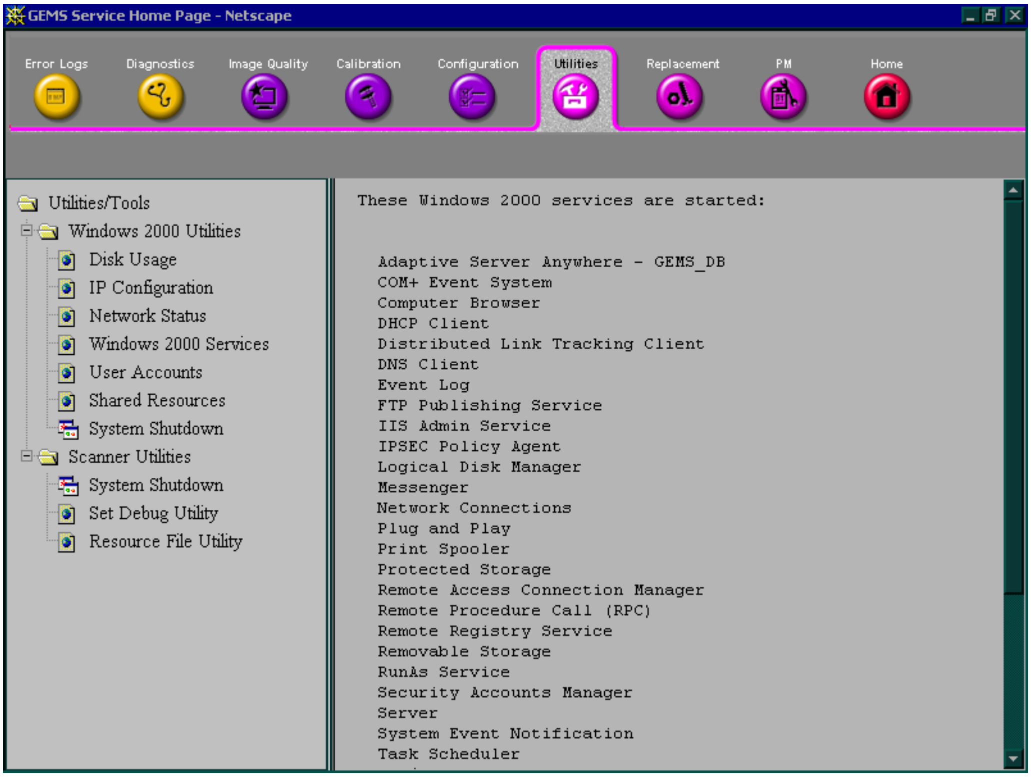
Figure 7-42 Network Status

7-6-9-1 Windows 2000 Utilities (cont'd)

Windows 2000 Services

This page displays a list of active Windows 2000 services.

A Windows 2000 Service is a computer program that has been automatically started and is running in the background on the computer.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

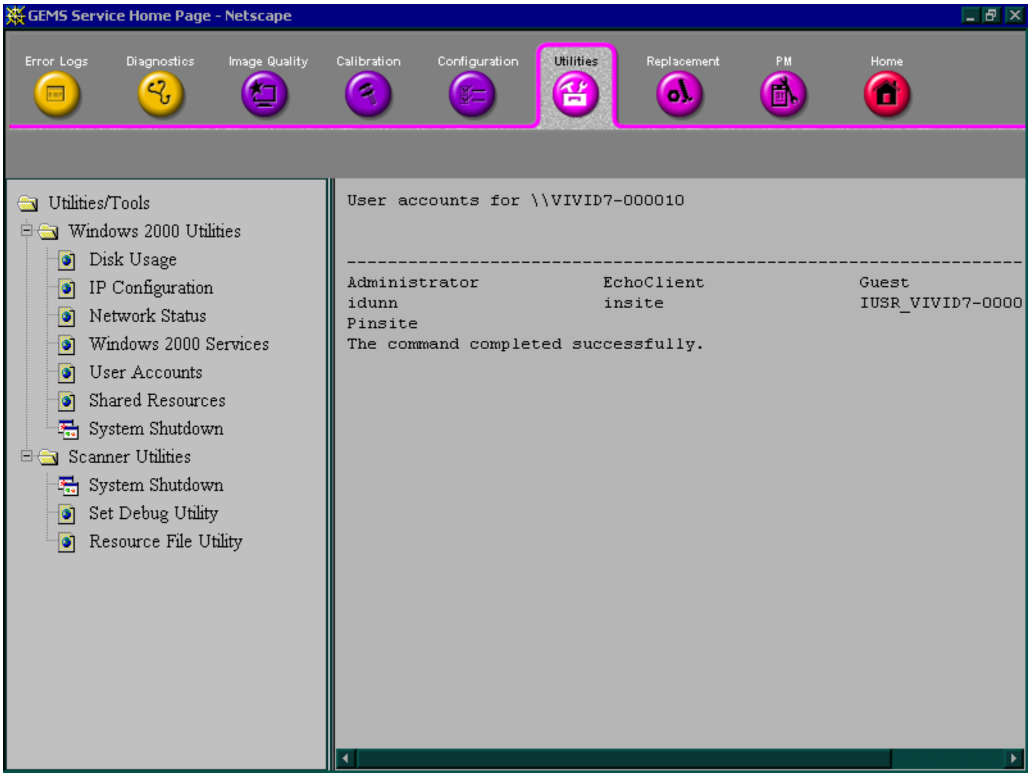
```
These Windows 2000 services are started:


  Adaptive Server Anywhere - GEMS_DB
  COM+ Event System
  Computer Browser
  DHCP Client
  Distributed Link Tracking Client
  DNS Client
  Event Log
  FTP Publishing Service
  IIS Admin Service
  IPSEC Policy Agent
  Logical Disk Manager
  Messenger
  Network Connections
  Plug and Play
  Print Spooler
  Protected Storage
  Remote Access Connection Manager
  Remote Procedure Call (RPC)
  Remote Registry Service
  Removable Storage
  RunAs Service
  Security Accounts Manager
  Server
  System Event Notification
  Task Scheduler
```

Figure 7-43 Windows 2000 Services

7-6-9-1 Windows 2000 Utilities (cont'd)

User Accounts

This page lists the Users that has been given access to this Vivid 7.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

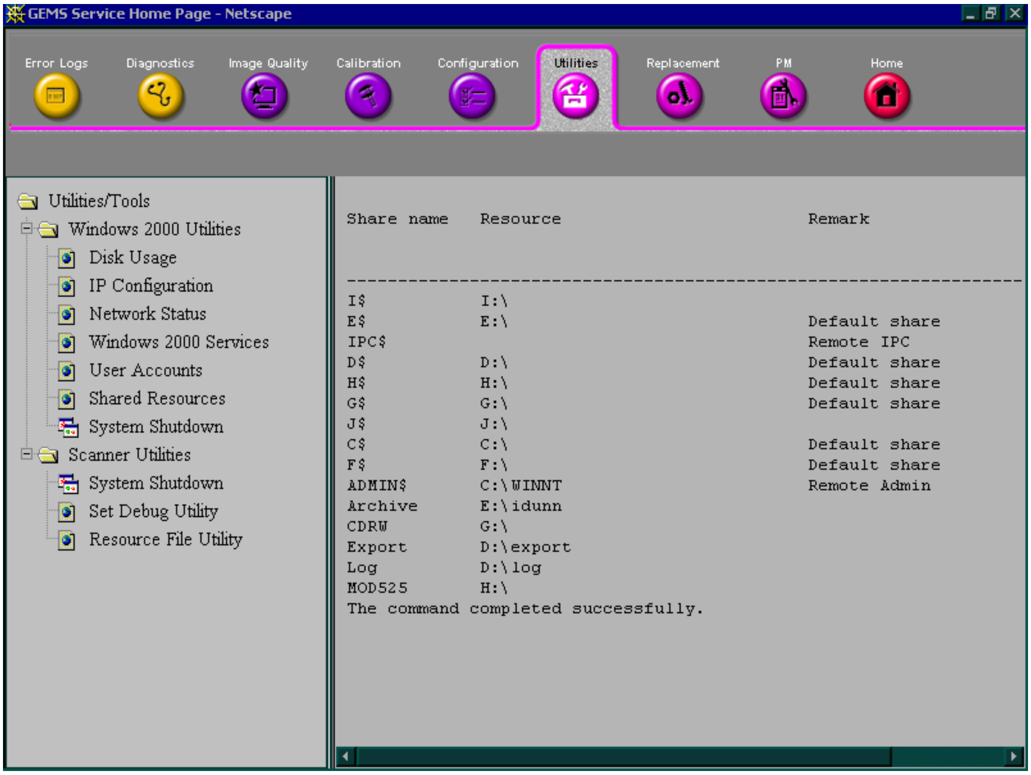
```
User accounts for \\VIVID7-000010


------------------------------------------------------------------
Administrator            EchoClient               Guest
idunn                    insite                   IUSR_VIVID7-0000
Pinsite
The command completed successfully.
```

Figure 7-44   User Accounts

7-6-9-1 Windows 2000 Utilities (cont'd)

Shared Resources

This screen displays all shared network resources on Vivid 7.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility

```
Share name   Resource                        Remark


-------------------------------------------------------------------
I$           I:\
E$           E:\                             Default share
IPC$                                         Remote IPC
D$           D:\                             Default share
H$           H:\                             Default share
G$           G:\                             Default share
J$           J:\
C$           C:\                             Default share
F$           F:\                             Default share
ADMIN$       C:\WINNT                        Remote Admin
Archive      E:\idunn
CDRW         G:\
Export       D:\export
Log          D:\log
MOD525       H:\
The command completed successfully.
```

Figure 7-45 Shared Resources

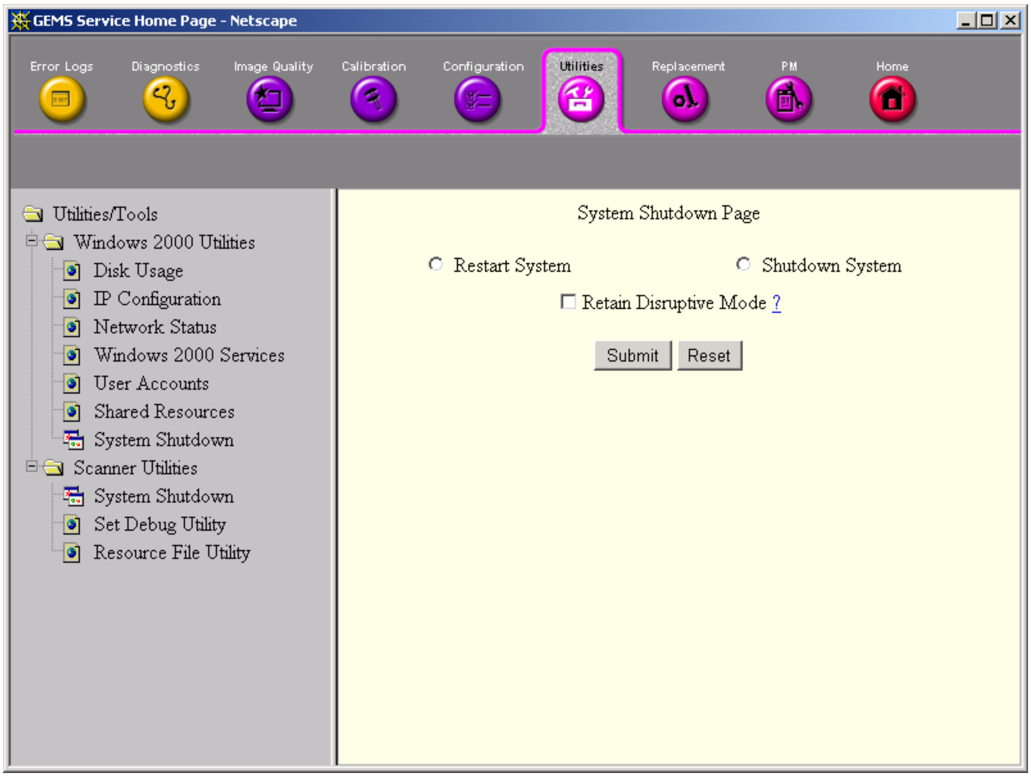
7-6-9-1 Windows 2000 Utilities (cont'd)

System Shutdown

NOTE: System Shutdown is intended for use from remote computer.

This menu gives you the ability to either Restart or Shutdown the Vivid 7.

NOTE: Retain Disruptive Mode should be kept unchecked if you are working locally on the scanner. It must be checked if working from an external computer.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility
Submit
Reset

System Shutdown Page

○ Restart System ○ Shutdown System

☐ Retain Disruptive Mode ?

Figure 7-46 Restart or Shutdown System

7-6-9-2 Scanner Utilities

System Shutdown

See: "System Shutdown" on page 7-43

Set Debug Utility

This function is only to be used on Request from GE Service. It is used for setting Debug Variables.

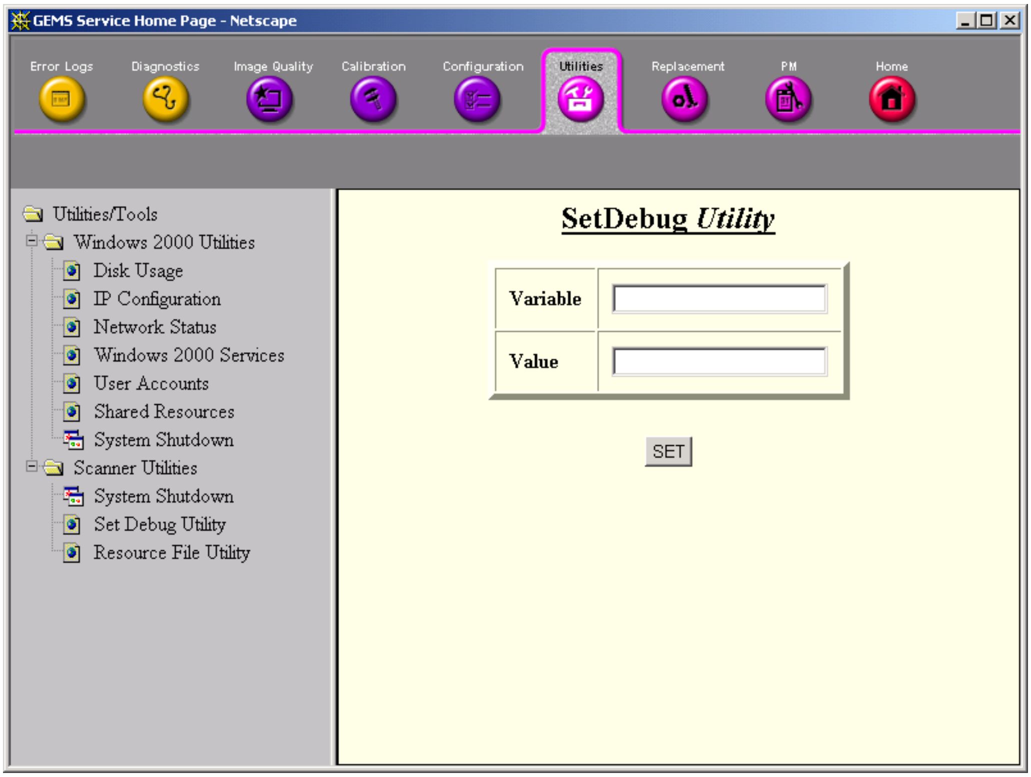

GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility
SetDebug Utility
Variable
Value
SET

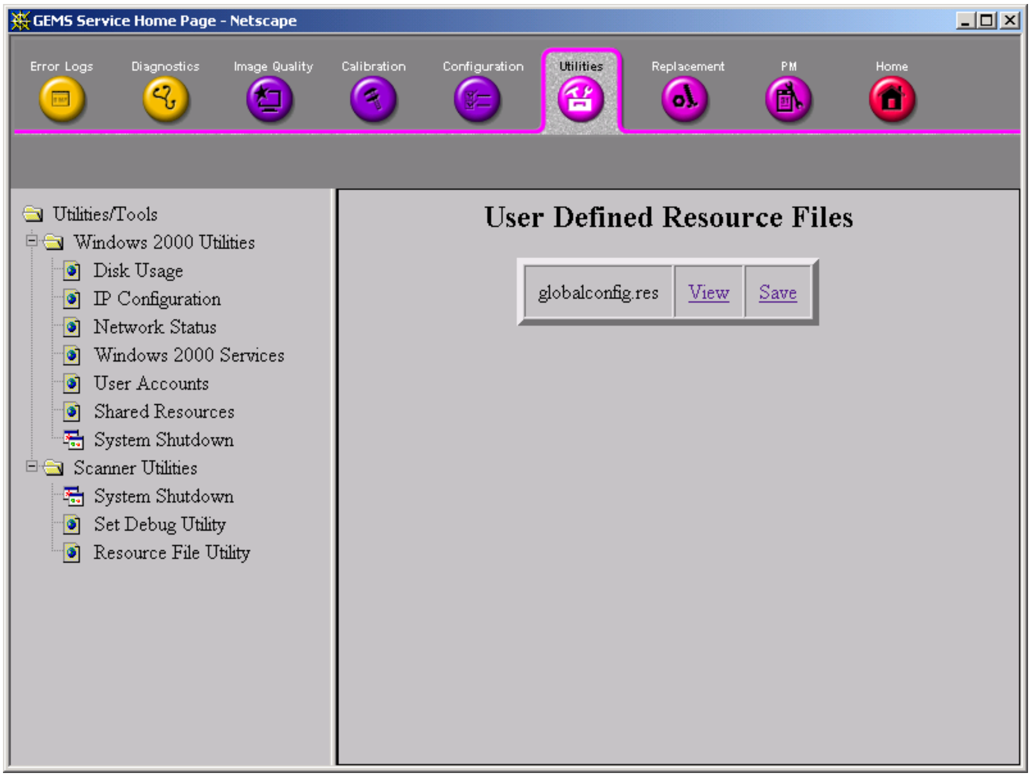
Figure 7-47 Set Debug Utility

7-6-9-2 Scanner Utilities (cont'd)

Resource File Utility

From this page you can review the listed *User Defined Resource File* and save it to MO.

- View
  Select View to examine the User Defined Resource file on-screen.
- Save
  Select Save and navigate to the MO drive to save the User Defined Resource file.

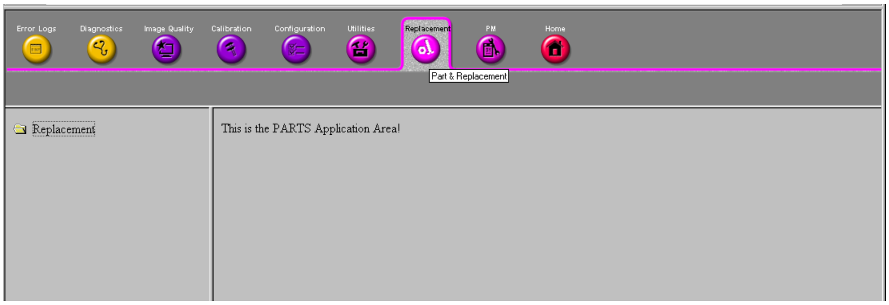

GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Windows 2000 Utilities
Disk Usage
IP Configuration
Network Status
Windows 2000 Services
User Accounts
Shared Resources
System Shutdown
Scanner Utilities
System Shutdown
Set Debug Utility
Resource File Utility
User Defined Resource Files
View
Save

globalconfig.res	View	Save

Figure 7-48 Resource File Utility

7-6-10 Replacement

Field is not populated.

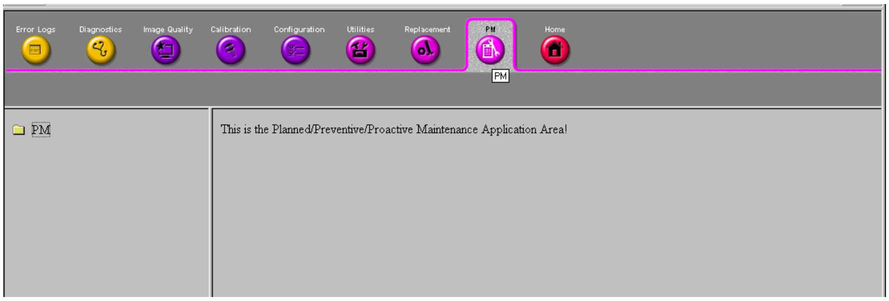

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Part & Replacement
Replacement

This is the PARTS Application Area!

Figure 7-49 Part Replacement Page

7-6-11 PM

Field is not populated.


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PM
PM

This is the Planned/Preventive/Proactive Maintenance Application Area!

Figure 7-50 Planned Maintenance Page

7-6-12 Home

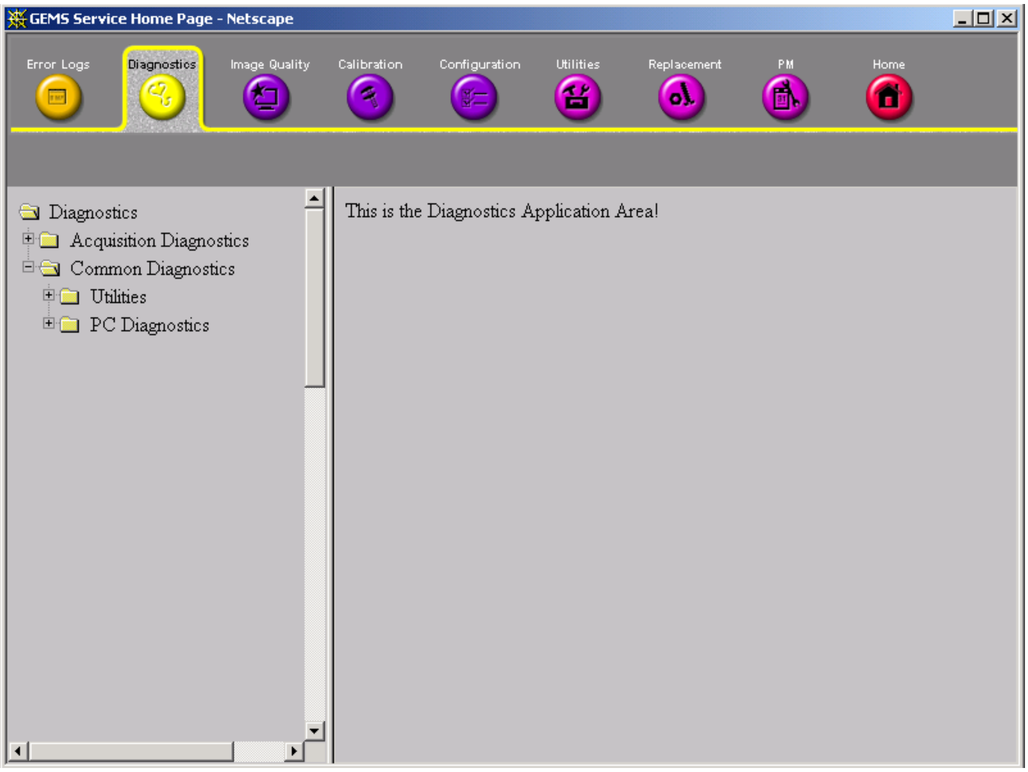
Select **HOME** to return to the Service Home Page.

7-6-13 Exit From Diagnostics

Select the “X” in the upper right corner of the screen to exit Diagnostics.

Section 7-7
Common Diagnostics

Common Diagnostics is a collection of diagnostics tools that are common for several of GE Ultrasound's products.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Common Diagnostics
Utilities
PC Diagnostics

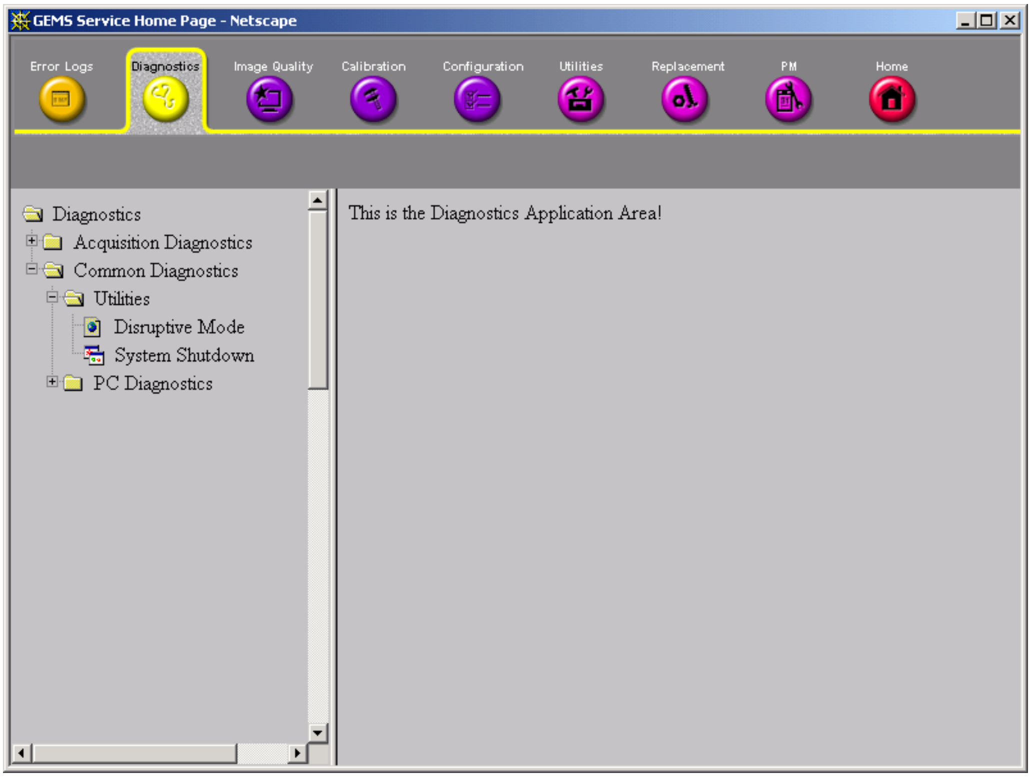
This is the Diagnostics Application Area!

Figure 7-51 Common Diagnostics

The Common Diagnostics folder has two sub-folders:

- Utilities
- PC Diagnostics

7-7-1 Common Diagnostics - Utilities


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Common Diagnostics
Utilities
Disruptive Mode
System Shutdown
PC Diagnostics

This is the Diagnostics Application Area!

Figure 7-52 Common Diagnostics - Utilities

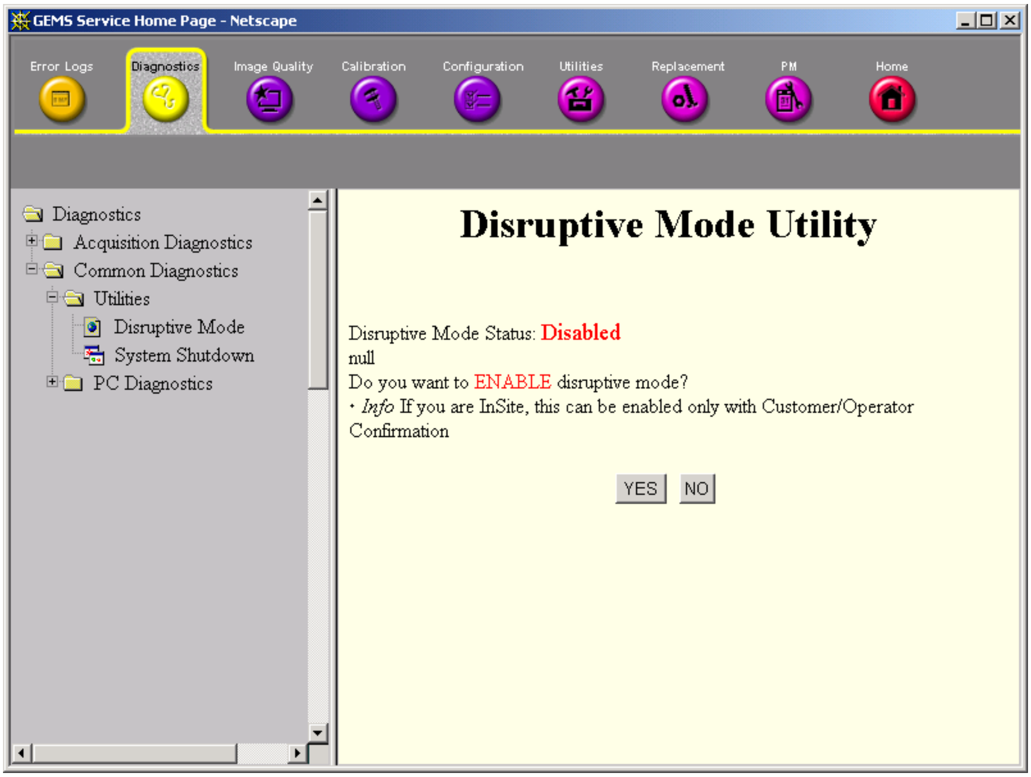
Utilities has two tools, both intended for use when connecting from a remote connected computer:

1.) Disruptive Mode
2.) System Shutdown

7-7-1-1 Disruptive Mode

Disruptive Mode utility is used to enable/disable Disruptive Mode.

Disruptive Mode must be used if a remote computer is used to control Vivid 7. Example: InSite.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Common Diagnostics
Utilities
Disruptive Mode
System Shutdown
PC Diagnostics
YES
NO

Disruptive Mode Utility

Disruptive Mode Status: Disabled
null
Do you want to ENABLE disruptive mode?
• *Info* If you are InSite, this can be enabled only with Customer/Operator Confirmation

Figure 7-53 Common Diagnostics - Utilities - Disruptive Mode Utility

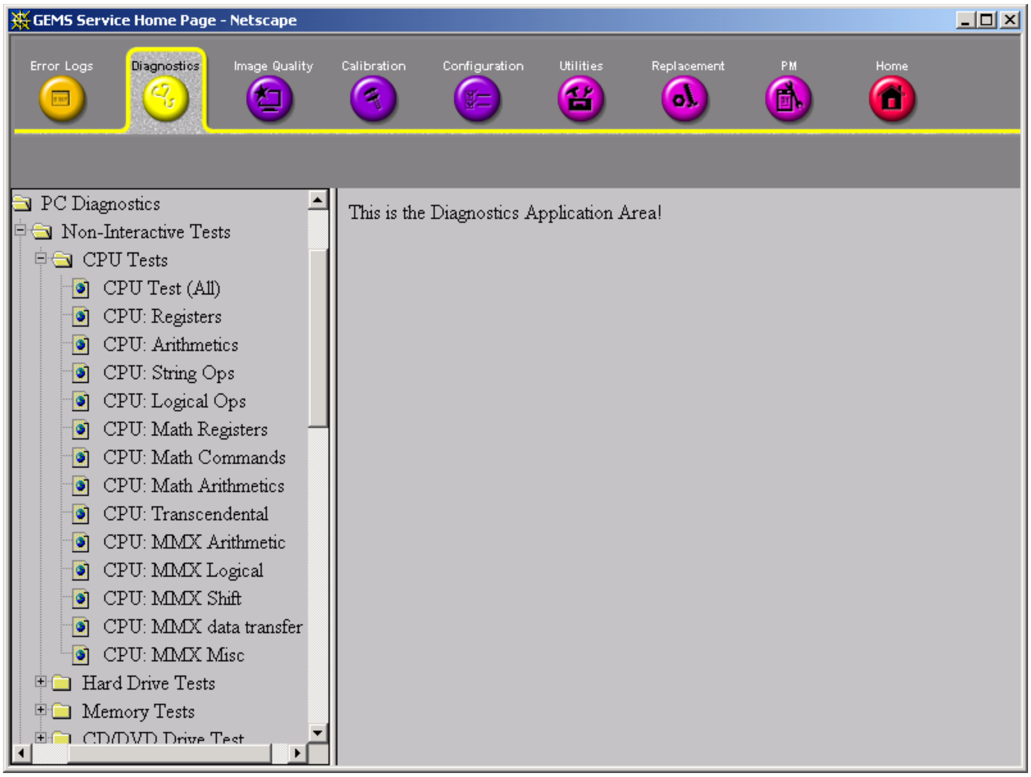
7-7-1-2 System Shutdown

Intended for use from remote computer. See: "System Shutdown" on page 7-43.

7-7-2 PC (Back-End Processor) Diagnostics, Non-Interactive Tests

The following sub-sections outline the non-interactive BEP Diagnostic tests.

7-7-2-1 CPU Tests


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PC Diagnostics
Non-Interactive Tests
CPU Tests
CPU Test (All)
CPU: Registers
CPU: Arithmetics
CPU: String Ops
CPU: Logical Ops
CPU: Math Registers
CPU: Math Commands
CPU: Math Arithmetics
CPU: Transcendental
CPU: MMX Arithmetic
CPU: MMX Logical
CPU: MMX Shift
CPU: MMX data transfer
CPU: MMX Misc
Hard Drive Tests
Memory Tests
CD/DVD Drive Test

This is the Diagnostics Application Area!

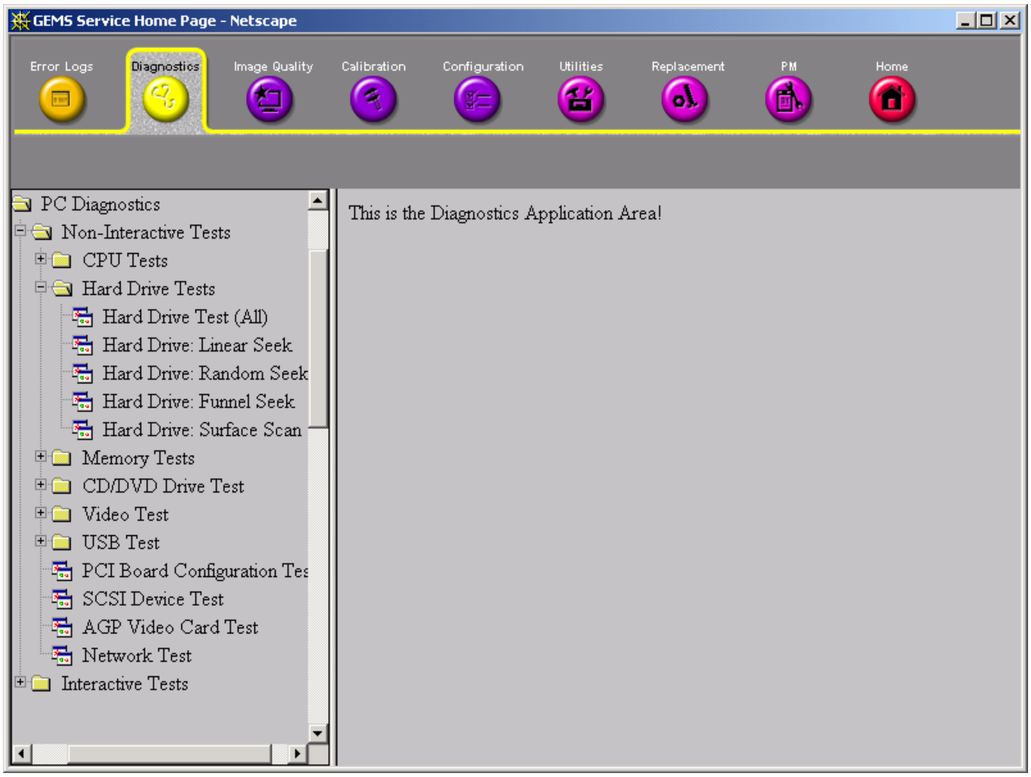
Figure 7-54 CPU Tests

- **CPU Test (All)** - This diagnostic performs a battery of tests on your CPU to ensure it is working properly. The following tests are a complete list of the tests performed on the PC's CPU.
- **CPU: Registers** - The CPU registers are tested using the default test patterns defined above. On 32 bit CPUs, the extended registers are also checked. If errors are detected, the failed registers are listed.
- **CPU: Arithmetic** - Tests the proper function of arithmetic commands ADC, ADD, DEC, DIV, IDIV, IMUL, INC, MUL, SBB and SUB with 16 and 32-bit operands. If errors are detected, the failed commands and operands are listed.
- **CPU: String Operations** - Tests the proper operation of string commands LODS, MOVS, SCAS and STOS with 8, 16 and 32-bit operands. If errors are detected, the failed commands and operands are listed.
- **CPU: Logical Operations** - Tests the proper operation of logical operations AND, NOT, OR and XOR with 16 and 32-bit operands. If errors are detected, the failed operands are listed.
- **CPU: Math Registers** - Tests coprocessor register stack, pointers and commands FLDLZ, FLDPI, FLDLN2, FLDLG2, FLDL2T, FLDL2E and FLD1. If errors are detected, the failed steps and commands are listed.
- **CPU: Math Commands** - Tests coprocessor commands FBLD/FBSTP, FLD/FST, FXCH, FCOM, FICOM, FTST, FXAM and FUCOM. If errors are detected, the failed instructions are listed.

7-7-2-1 CPU Tests (cont'd)

- **CPU: Transcendental** - Tests coprocessor transcendental commands F2XM1, FPATAN, FPTAN, FYL2X, FYL2XP1, FCOS, FSIN and FSINCOS. If errors are detected, the failed commands are listed.
- **CPU: MMX Arithmetic** - Tests MMX commands PADD, PSUB, PMUL and PMADD. If errors are detected, the failed commands are listed.
- **CPU: MMX Logical** - Tests MMX commands PAND, PANDN, POR and PXOR. If errors are detected, the failed commands are listed.
- **CPU: MMX Shift** - Tests MMX commands PSLL and PSRL. If errors are detected, the failed commands are listed.
- **CPU: MMX Data Transfer** - Tests MMX commands MOVD and MOVQ. If errors are detected, the failed commands are listed.
- **CPU: MMX Misc.** - Tests MMX commands PCMPEQ, PCMPGT, PACKSS, PACKUS, PUNPCK and PUNPCK. If errors are detected, the failed commands are listed.

7-7-2-2 Hard Drive Tests


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PC Diagnostics
Non-Interactive Tests
CPU Tests
Hard Drive Tests
Hard Drive Test (All)
Hard Drive: Linear Seek
Hard Drive: Random Seek
Hard Drive: Funnel Seek
Hard Drive: Surface Scan
Memory Tests
CD/DVD Drive Test
Video Test
USB Test
PCI Board Configuration Tes
SCSI Device Test
AGP Video Card Test
Network Test
Interactive Tests

This is the Diagnostics Application Area!

Figure 7-55 Hard Drive Tests

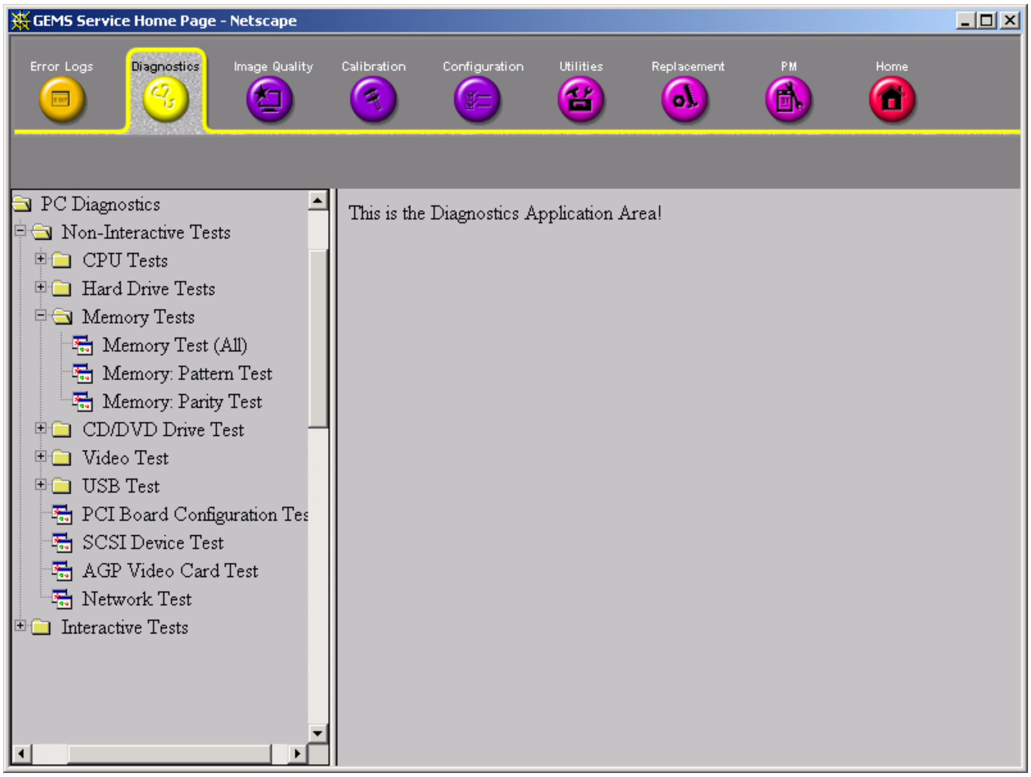
- **Hard Drive Test (All)** - The Hard Drive test examines your hard disk drive using a series of tests to ensure that your drive can perform its functions.

  The following tests are performed on your hard drive to ensure the hard disk controller and the drive mechanism are working correctly. The disk surface itself is also checked.

NOTE: The hard drive test can take over ten minutes.

- **Hard Drive: Linear Seek** - Hard disk drive heads are moved from track 0 to the maximum track one track at a time.
- **Hard Drive: Random Seek** - Hard disk drive heads are moved randomly several hundred times.
- **Hard Drive: Funnel Seek** - Hard disk drive heads are moved in a funnel fashion, i.e., from the first track on the drive to the last, then to the second track, then to the second to last track, then to the third track, and so on.
- **Hard Drive: Surface Scan** - This test scans for surface defects on the hard disk drive.

7-7-2-3 Memory Tests

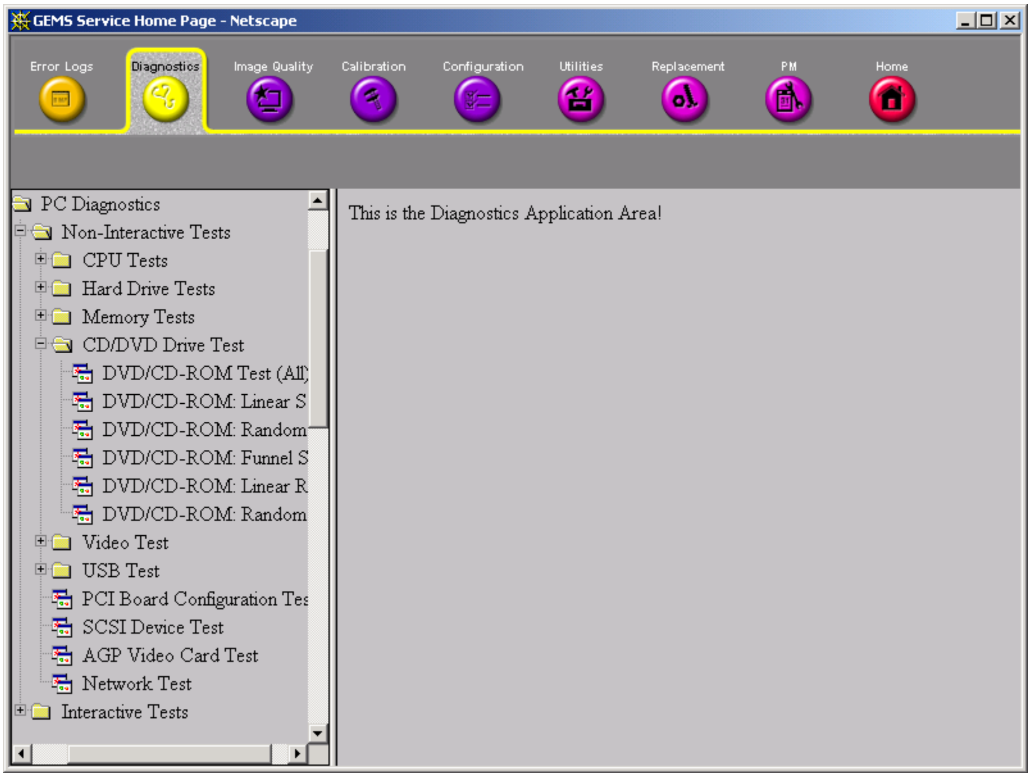

GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PC Diagnostics
Non-Interactive Tests
CPU Tests
Hard Drive Tests
Memory Tests
Memory Test (All)
Memory: Pattern Test
Memory: Parity Test
CD/DVD Drive Test
Video Test
USB Test
PCI Board Configuration Tes
SCSI Device Test
AGP Video Card Test
Network Test
Interactive Tests

This is the Diagnostics Application Area!

Figure 7-56 Memory Tests

- **Memory Test (All)** - Eighteen test patterns are used to test memory locations. If errors are detected, the address of the block the error was detected in is shown. During testing, these diagnostics will also look out for parity errors and other exceptions. These will be added to the Test Log as errors if encountered.
- **Memory: Pattern Test** - The program uses several test patterns to test as much memory as possible.
- **Memory: Parity Test** - This test checks for parity errors on the memory bus during intensive string transfer operations. If an error is detected, the address of the failed block is displayed.

7-7-2-4 CD/DVD-ROM Drive Tests


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PC Diagnostics
Non-Interactive Tests
CPU Tests
Hard Drive Tests
Memory Tests
CD/DVD Drive Test
DVD/CD-ROM Test (All)
DVD/CD-ROM: Linear S
DVD/CD-ROM: Random
DVD/CD-ROM: Funnel S
DVD/CD-ROM: Linear R
DVD/CD-ROM: Random
Video Test
USB Test
PCI Board Configuration Tes
SCSI Device Test
AGP Video Card Test
Network Test
Interactive Tests

This is the Diagnostics Application Area!

Figure 7-57 CD-Rom Drive Tests

- **CD-ROM Test (All)** - The CD-ROM test examines the CD-ROM drive to make sure it is working properly. Use a data CD-ROM disc for these tests. You cannot use an audio CD, such as a regular commercial music CD, with this test.

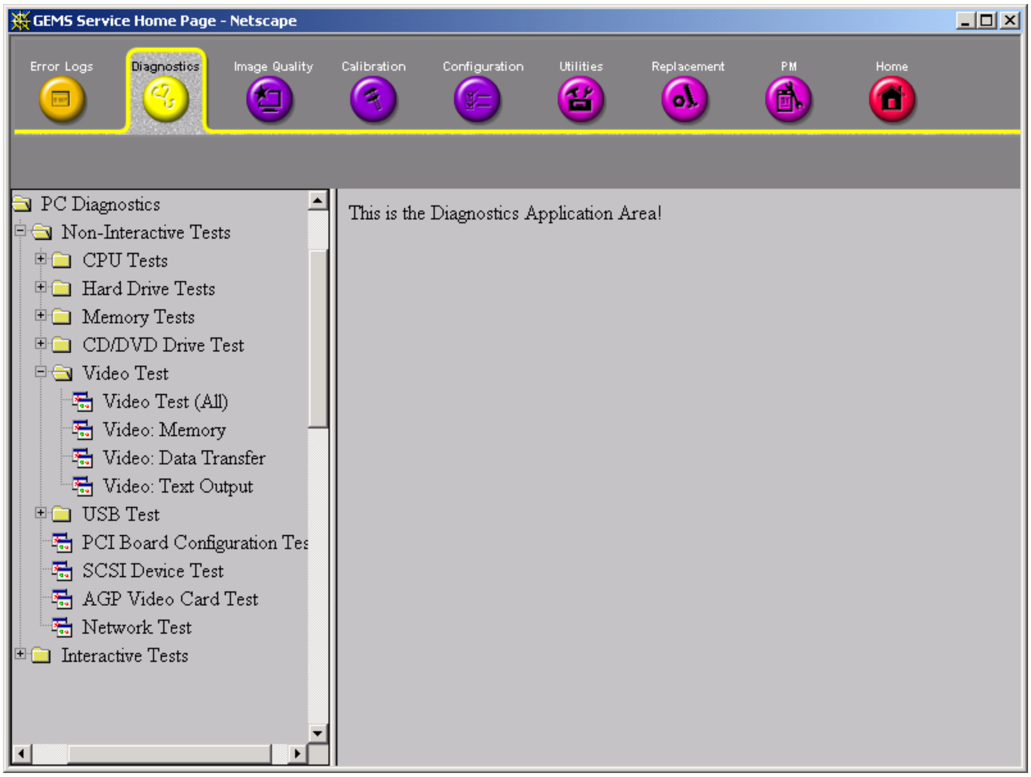
NOTE: *The BEP is sometimes slow in recognizing a newly inserted CD-ROM disc. It is best to wait a few seconds after inserting a disc into the drive before you run any tests.*

There are two types of CD-ROM tests:

1.) *Seek Tests:* Ensures the drive can access all locations on a disc, and
2.) *Read Tests:* Ensures the drive can read all the data.

- **CD-ROM: Linear Seek** - Tests that all locations can be accessed on a CD-ROM disc in a linear fashion, starting from the first to the last.
- **CD-ROM: Random Seek** - Tests that all locations can be accessed on a CD-ROM disc randomly.
- **CD-ROM: Funnel Seek** - Tests that all locations can be accessed on a CD-ROM disc in a funnel fashion, starting from the first then moving to the last, then, at the next pass starting from the second location then moving to the next to the last, and so on
- **CD-ROM: Linear Read** - Reads the data on the CD-ROM in a linear fashion, starting from the start to the end.
- **CD-ROM: Random Read** - Reads the data on the CD-ROM randomly.

7-7-2-5 Video Test


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PC Diagnostics
Non-Interactive Tests
CPU Tests
Hard Drive Tests
Memory Tests
CD/DVD Drive Test
Video Test
Video Test (All)
Video: Memory
Video: Data Transfer
Video: Text Output
USB Test
PCI Board Configuration Tes
SCSI Device Test
AGP Video Card Test
Network Test
Interactive Tests

This is the Diagnostics Application Area!

Figure 7-58 Video Tests

- **Video Test (All)** - This diagnostic tests your system's video capabilities. This involves testing the video memory with 18 patterns, testing your graphics acceleration, and text output. You will see these tests being performed on your monitor.

  You can cancel this test at any time by hitting the Escape (Esc) key.

The following tests are performed on your monitor:

- **Video: Memory** - Video memory is tested by filling the video buffer with 18 test patterns, one pattern at a time. The tests will fill the entire screen with a single color.
- **Video: Data Transfer** - This tests the graphics acceleration part of your video controller. These tests will appear on your screen as black and white concentric squares and rectangles of various sizes and colors. If errors are detected, the locations of the problems are displayed.
- **Video: Text Output** - This test prints a text string in random sizes and colors to tests your video device driver and video controller.

7-7-2-6 PCI Board Configuration Test

A bus is a set of circuits, wires or connectors which connect the various components of your system. A PCI (Peripheral Component Interconnect) bus is a fast standard bus which is common in Pentium systems. Various tests are run on the PCI bus in order to ensure it is working up to speed.

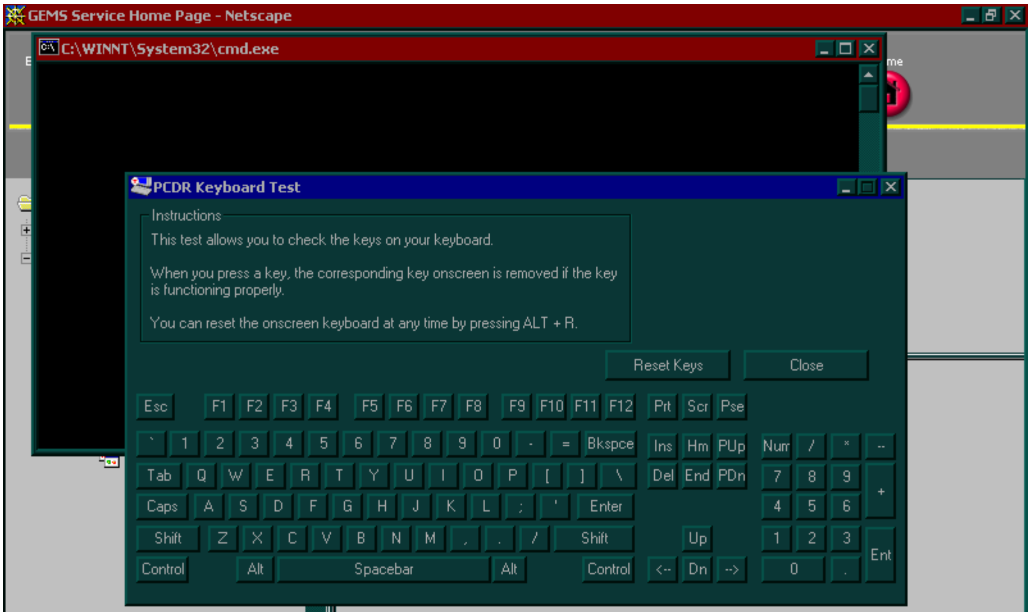
The motherboard is scanned to verify the configuration space and to make sure the diagnostics can communicate with the board.

7-7-3 PC (Back-End Processor) Diagnostics, Interactive Tests

7-7-3-1 Keyboard Test

1.) Double-click **Keyboard Test** from the PC Diagnostics interactive tests menu.

2.) Select the **EXECUTE** button. A keyboard layout is displayed on which you can see the keys of a standard computer keyboard. Some of these keys are missing on Vivid 7.


GEMS Service Home Page - Netscape
C:\WINNT\System32\cmd.exe
PCDR Keyboard Test
Instructions
Reset Keys
Close
Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 Prt Scr Pse
` 1 2 3 4 5 6 7 8 9 0 - = Bkspce Ins Hm PUp Num / * --
Tab Q W E R T Y U I O P [ ] \ Del End PDn 7 8 9 +
Caps A S D F G H J K L ; ' Enter 4 5 6
Shift Z X C V B N M , . / Shift Up 1 2 3 Ent
Control Alt Spacebar Alt Control <-- Dn --> 0 .

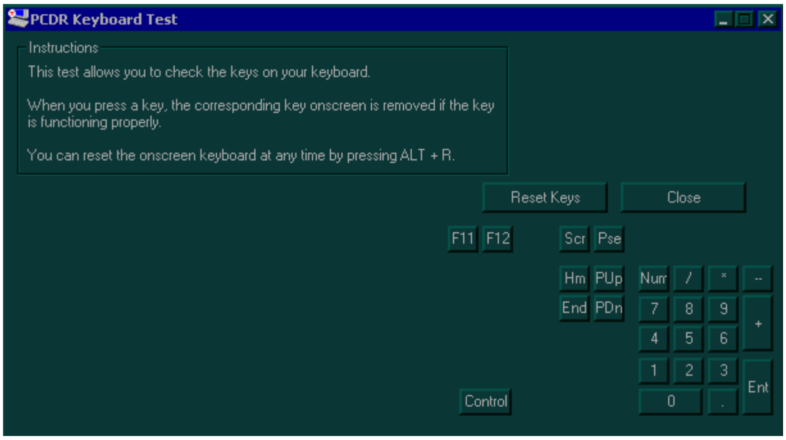
This test allows you to check the keys on your keyboard.

When you press a key, the corresponding key onscreen is removed if the key is functioning properly.

You can reset the onscreen keyboard at any time by pressing ALT + R.

Figure 7-59 Keyboard Test

3.) Press each key on your keyboard once and make sure that the corresponding keys on-screen are removed from view. If a key on-screen is not removed, that key may be damaged and you may have to have your keyboard repaired or replaced. Since some of the displayed keys are missing on Vivid 7, they cannot be removed. See Figure 7-60.


PCDR Keyboard Test
Instructions
Reset Keys
Close
F11 F12 Scr Pse
Hm PUp Num / * --
End PDn 7 8 9 +
4 5 6
1 2 3 Ent
Control 0 .

This test allows you to check the keys on your keyboard.

When you press a key, the corresponding key onscreen is removed if the key is functioning properly.

You can reset the onscreen keyboard at any time by pressing ALT + R.

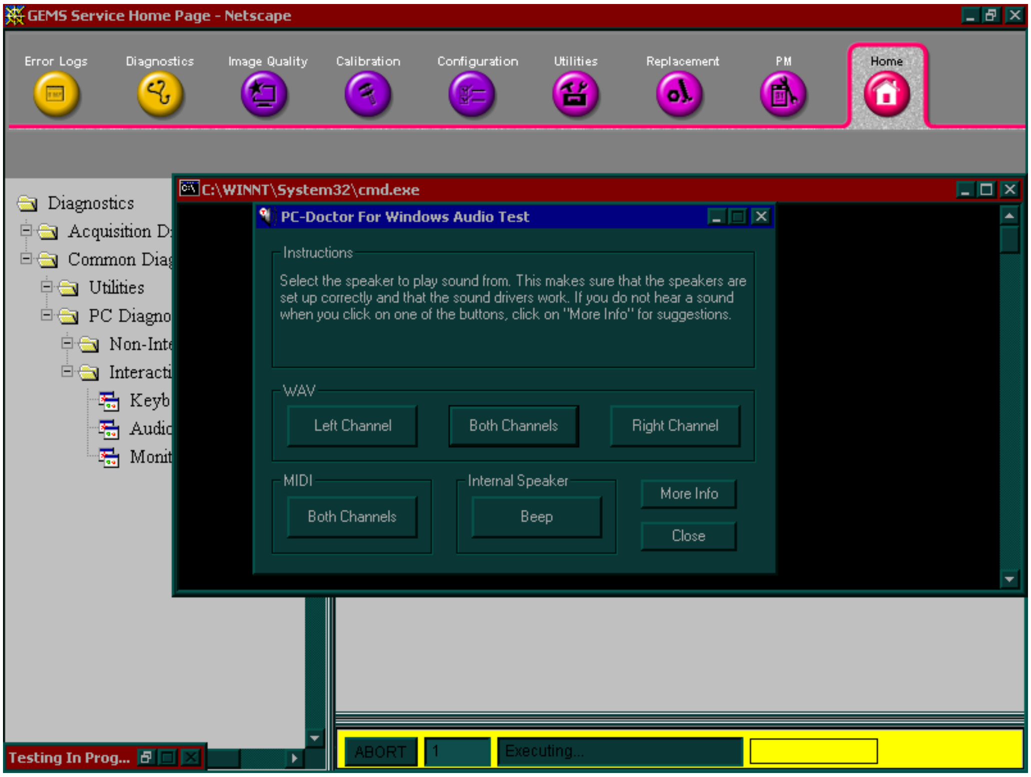
Figure 7-60 Remaining Keys On-screen After All Keyboard's Keys have been Pressed

4.) To reset the keyboard, select the Reset Keys button.

5.) To exit the test, select Close.

7-7-3-2 Audio Test

1.) Double-click **Audio Test** from the PC Diagnostic interactive tests menu.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition D
Common Diag
Utilities
PC Diagno
Non-Inte
Interacti
Keyb
Audi
Monit
C:\WINNT\System32\cmd.exe
PC-Doctor For Windows Audio Test
Instructions
WAV
Left Channel
Both Channels
Right Channel
MIDI
Both Channels
Internal Speaker
Beep
More Info
Close
Testing In Prog...
ABORT
1
Executing...

Select the speaker to play sound from. This makes sure that the speakers are set up correctly and that the sound drivers work. If you do not hear a sound when you click on one of the buttons, click on "More Info" for suggestions.

Figure 7-61 Sound Tests

2.) To test the WAV sound reproduction select Left Channel, Right Channel, or Both Channels to test your speakers. You should hear a guitar chord.

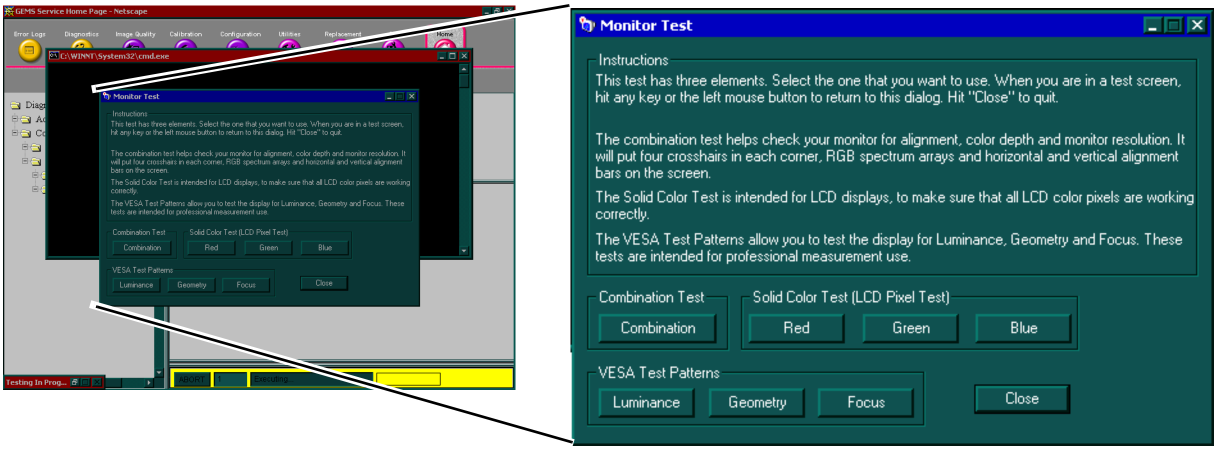
3.) To test MIDI sound reproduction select the button under MIDI. You should hear a few seconds of recorded music.

4.) Select the Beep button. You should hear a low “beep” from your Back-End Processor. (It may be difficult to hear due to noise from the fan.

If no sound is produced in these tests, choose the More Info button in the Audio Test dialog box for information about possible causes and solutions.

7-7-3-3 Monitor Test

Double-click **Monitor Test** from the PC Diagnostic interactive tests menu.


GEMS Service Home Page - Netscape
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
Home
C:\WINNT\System32\cmd.exe
Testing In Prog...
ABORT
Executing...
Monitor Test
Combination Test
Solid Color Test (LCD Pixel Test)
Combination
Red
Green
Blue
VESA Test Patterns
Luminance
Geometry
Focus
Close

Instructions

This test has three elements. Select the one that you want to use. When you are in a test screen, hit any key or the left mouse button to return to this dialog. Hit "Close" to quit.

The combination test helps check your monitor for alignment, color depth and monitor resolution. It will put four crosshairs in each corner, RGB spectrum arrays and horizontal and vertical alignment bars on the screen.

The Solid Color Test is intended for LCD displays, to make sure that all LCD color pixels are working correctly.

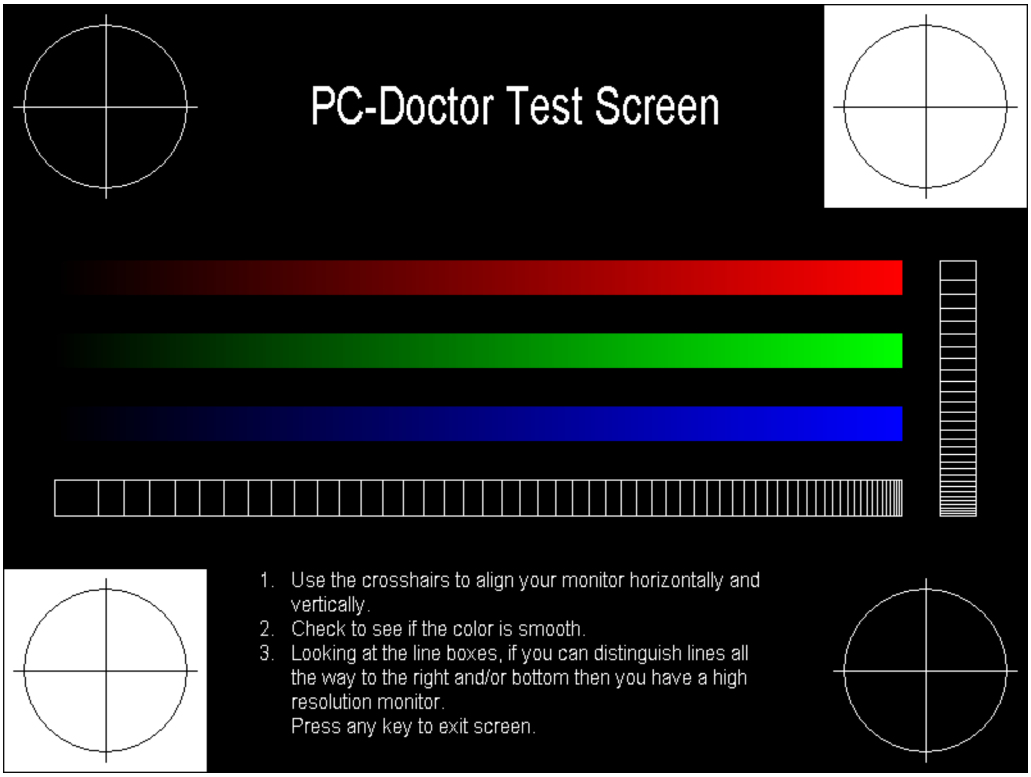
The VESA Test Patterns allow you to test the display for Luminance, Geometry and Focus. These tests are intended for professional measurement use.

Figure 7-62 Monitor Test

The monitor test dialog box presents you with three options:

- **Combination Test** - Checks the monitor for alignment, color depth, and monitor resolution. It will put four cross-hairs in each corner, RGB (Red Green Blue) spectrum arrays and horizontal and vertical alignment bars on the screen.

NOTE: In most cases, you will choose the Combination Test.



PC-Doctor Test Screen

1. Use the crosshairs to align your monitor horizontally and vertically.
2. Check to see if the color is smooth.
3. Looking at the line boxes, if you can distinguish lines all the way to the right and/or bottom then you have a high resolution monitor.

Press any key to exit screen.

Figure 7-63 Monitor Test

7-7-3-3 Monitor Test (cont'd)

- **Solid Color Test** - The solid color test is for laptop and LCD (Liquid Crystal Display) panel displays. This test displays solid color screens to allow you to make sure all color pixels are operating correctly.
- **VESA (Video Electronics Standards Association) Test Patterns** - The VESA test patterns checks luminance, geometry, and focus. The VESA tests are designed for professional measurement use.

Luminance

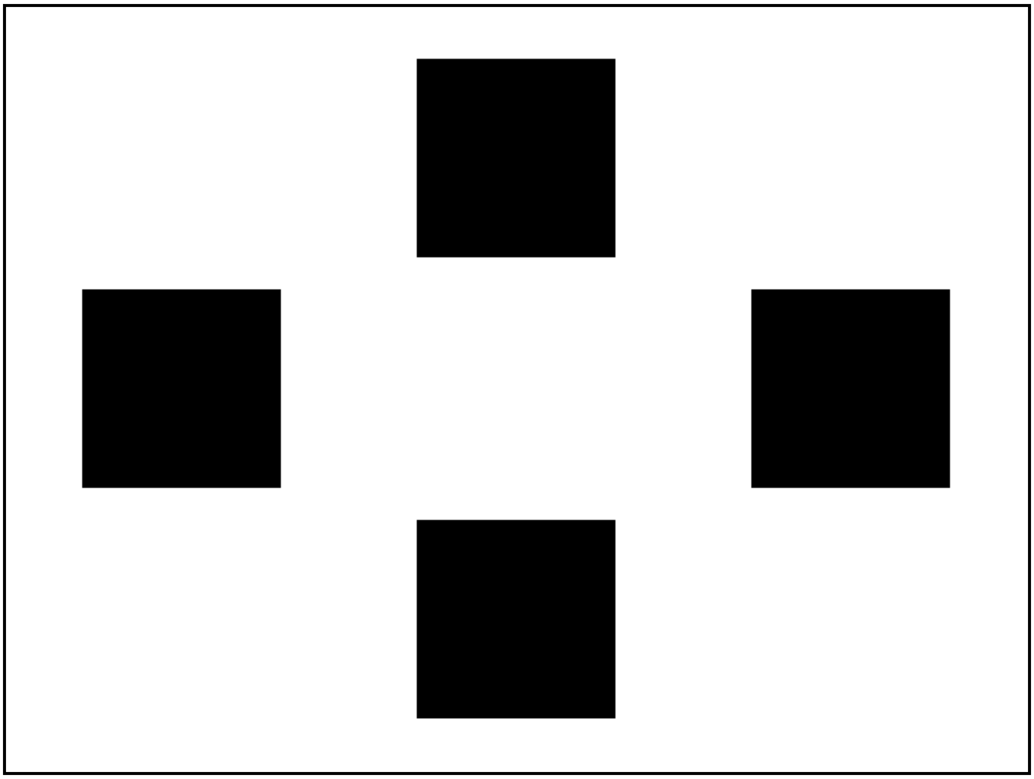


Figure 7-64 Monitor, VESA Test Pattern, Luminance

7-7-3-3 Monitor Test (cont'd)

Geometry

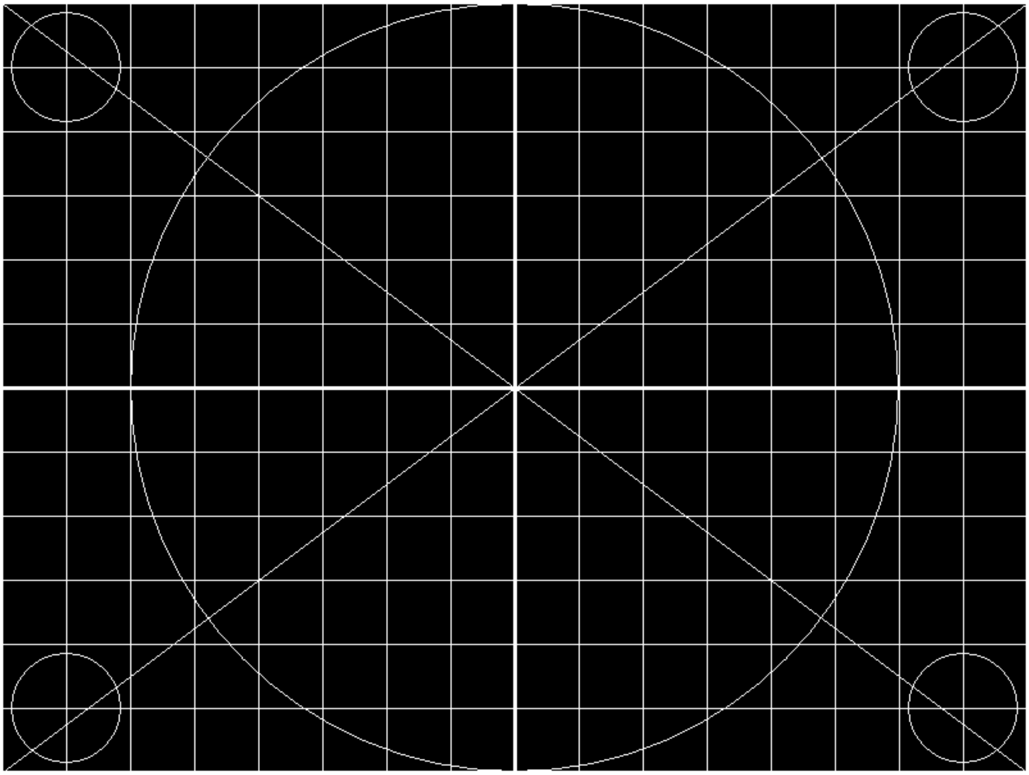


Figure 7-65 Monitor, VESA Test Pattern, Geometry

7-7-3-3 Monitor Test (cont'd)

Focus

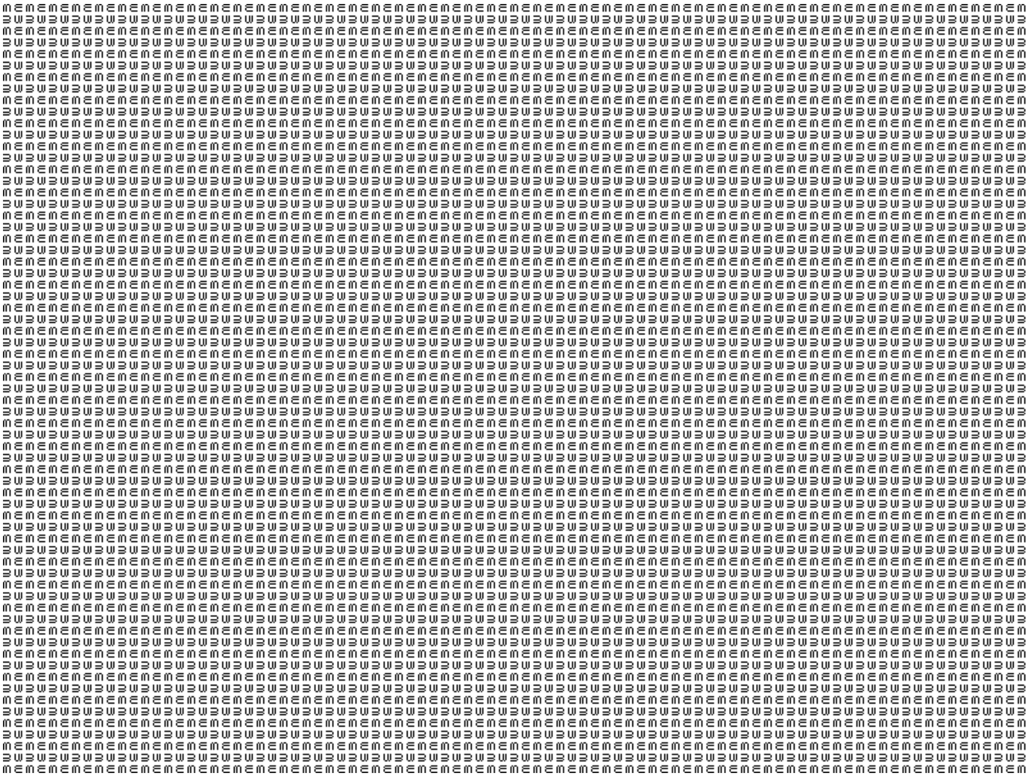


Figure 7-66 Monitor, VESA Test Pattern, Focus

Always shutdown the system and reboot after a diagnostics session.

Section 7-8
Acquisition Diagnostics

7-8-1 Acquisition Diagnostics Introduction

- If the scanner is running, but an error that may be a hardware failure, has been registered, then continue to read.

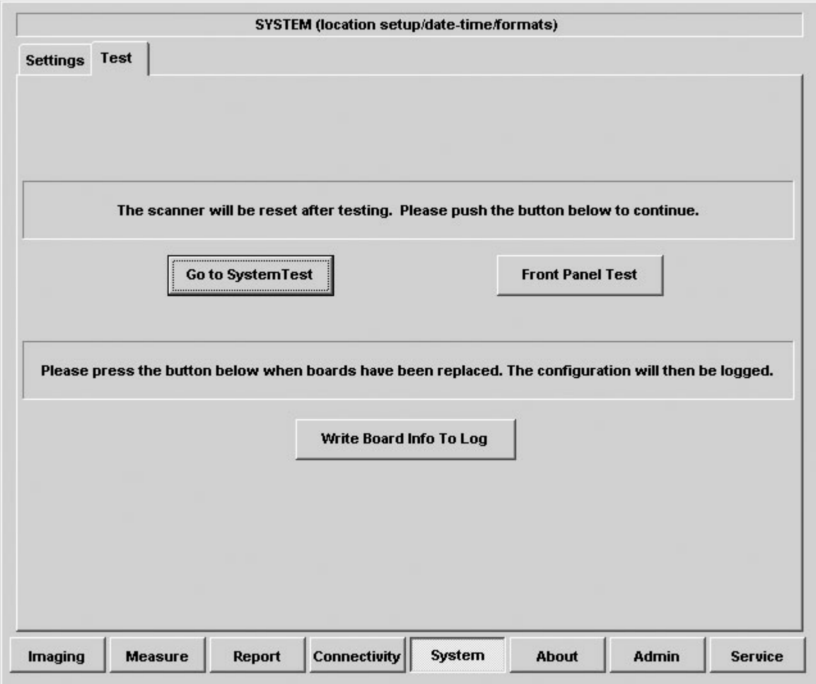
7-8-1-1 Start System Test

To start the System Test, power up the scanner, see 4-2-2 - Power ON/ Boot UP on page 4-3 for detailed instructions.

After scanner initialization is complete, continue with the steps below;

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
2.) Select **SYSTEM** from the bottom of the menu that appears on the monitor.
3.) Select **TEST**.

.


SYSTEM (location setup/date-time/formats)
Settings
Test
Go to SystemTest
Front Panel Test
Write Board Info To Log
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

The scanner will be reset after testing. Please push the button below to continue.

Please press the button below when boards have been replaced. The configuration will then be logged.

Figure 7-67 System > Test selection screen

4.) Select **GO TO SYSTEM TEST** to select the Calibration/Test screen.

7-8-2 Calibration Screen

After following the steps in 7-8-1-1 "Start System Test" on page 7-63, the default screen will be the Calibration screen.

The lower part of the Calibration screen is different on units with Front-End Processor version 1 (FEP1) and Front-End Processor version 2 (FEP2).

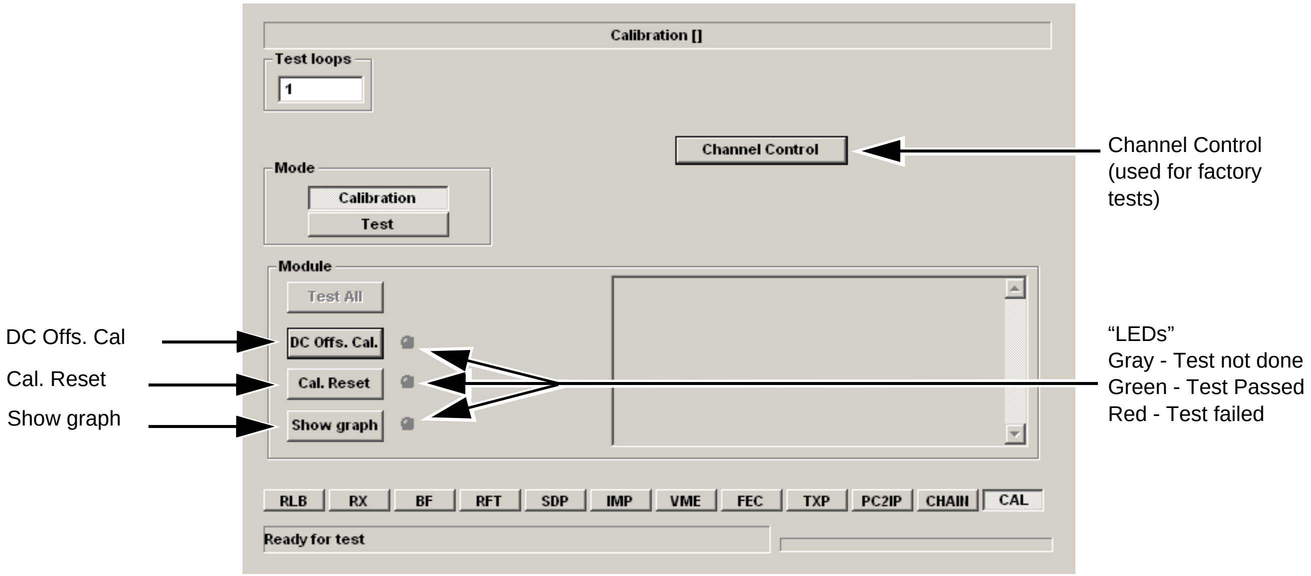
7-8-2-1 Functions Available from the Calibration Screen

These functions are available from the Calibration screen.

- DC Offset Calibration (DC Offs. Cal) of the A/D converters in the Front-End.
- Reset the calibration (Cal. Reset) to the factory default setting.
- Show a graph regarding the calibration (Show graph).
- Deselect/Select channels are used in manufacturing to isolate noisy channels (Channel Control).

  With a linear probe connected to the system, it is possible to disconnect groups of channels either on the TX Board or on the RX Board to isolate the noise source.
- The buttons in the lower part of the screen are used for board testing (see 7-8-3 - System Test on page 7-66).

The number of buttons in the lower row are different for units with FEP1 and FEP2. The illustration in Figure 7-68 is the Calibration Screen on units with FEP1.

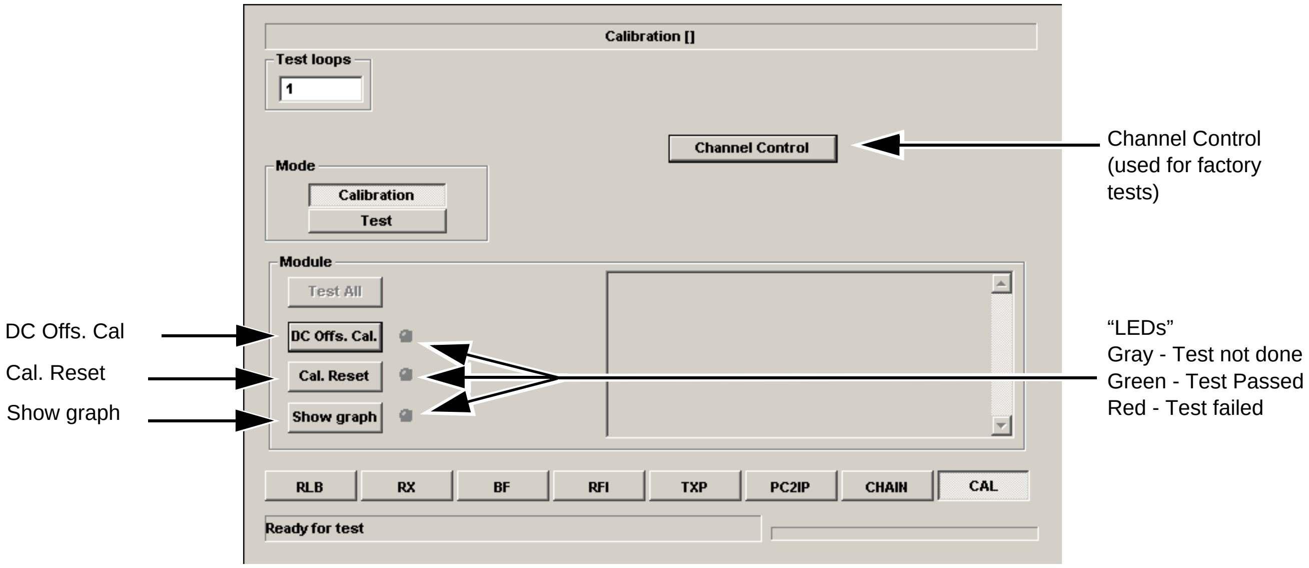

Calibration []
Test loops
1
Channel Control
Mode
Calibration
Test
Module
Test All
DC Offs. Cal.
Cal. Reset
Show graph
RLB
RX
BF
RFT
SDP
IMP
VME
FEC
TXP
PC2IP
CHAIN
CAL
Channel Control (used for factory tests)
DC Offs. Cal
Cal. Reset
Show graph
“LEDs”
Gray - Test not done
Green - Test Passed
Red - Test failed

Ready for test

Figure 7-68 Calibration Dialog on units with Front-End rack version - 1 (FEP1)

Figure 7-69 "Calibration Screen on units with FEP2" on page 7-65 illustrates the Calibration Screen on units with FEP2.

7-8-2-1 Functions Available from the Calibration Screen (cont'd)


Calibration []
Mode
Calibration
Test
Module
Test All
DC Offs. Cal.
Cal. Reset
Show graph
RLB
RX
BF
RFI
TXP
PC2IP
CHAIN
CAL

Test loops: 1

Ready for test

Channel Control (used for factory tests)

DC Offs. Cal

Cal. Reset

Show graph

"LEDs"
Gray - Test not done
Green - Test Passed
Red - Test failed

Figure 7-69 Calibration Screen on units with FEP2

To start a test, select the respective button.

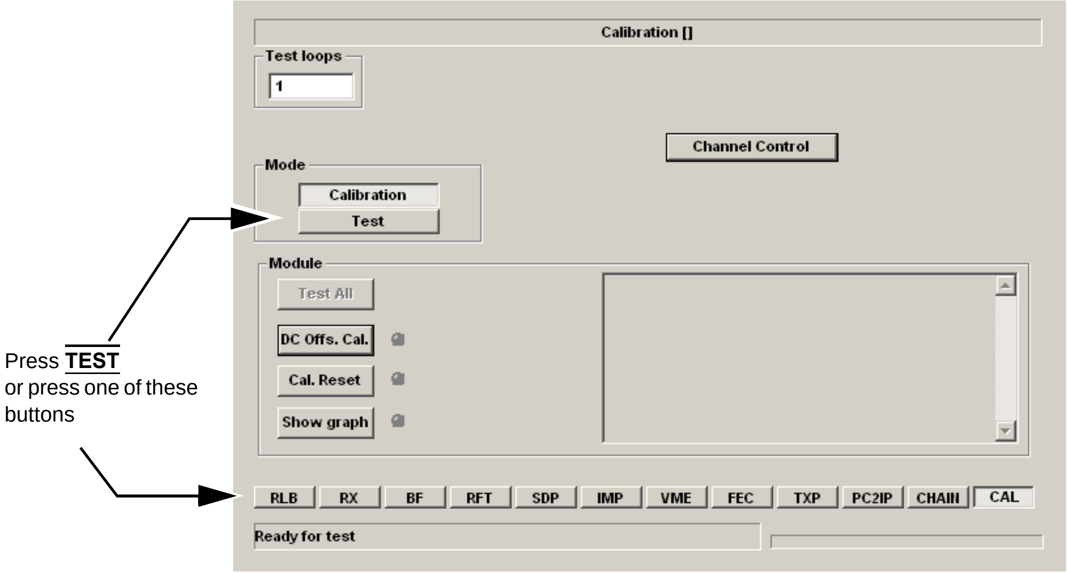
The "LEDs" in the Calibration Screen will change color when a test has been done;

- GREEN indicates that the test PASSED.
- RED indicates that the test FAILED.

7-8-3 System Test

7-8-3-1 Select the Test Screen

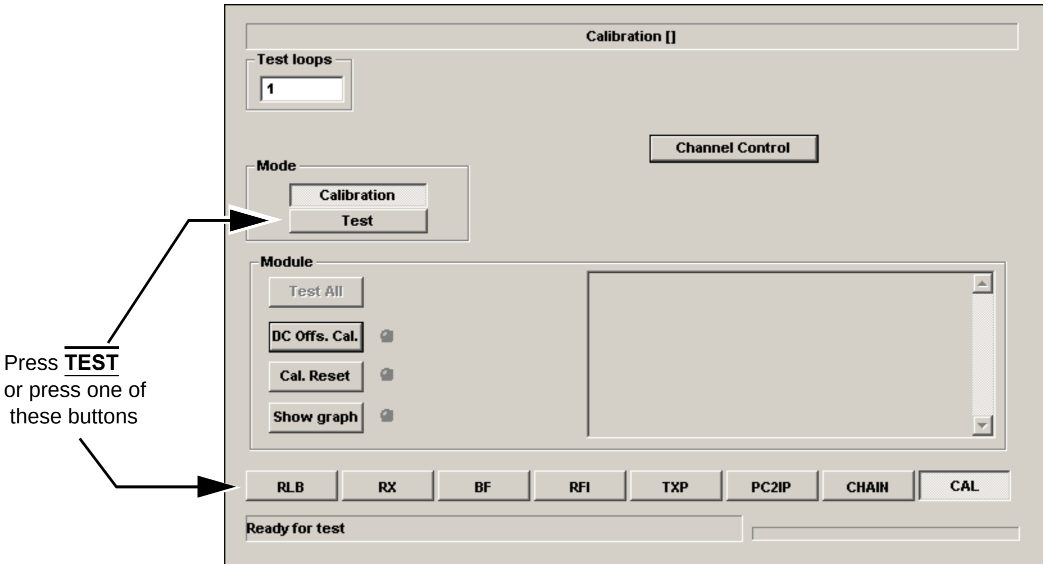
From the **Calibration** screen, select **TEST** or select one of the buttons (not **CAL**) in the lower part of the screen. See Figure 7-70 - Select Test Window (FEP1) and Figure 7-71 - Select Test Window (FEP2).


Calibration []
Test loops
1
Channel Control
Mode
Calibration
Test
Module
Test All
DC Offs. Cal.
Cal. Reset
Show graph
RLB
RX
BF
RFT
SDP
IMP
VME
FEC
TXP
PC2IP
CHAIN
CAL

Ready for test

Press **TEST** or press one of these buttons

Figure 7-70 Select Test Window (FEP1)


Calibration []
Test loops
1
Channel Control
Mode
Calibration
Test
Module
Test All
DC Offs. Cal.
Cal. Reset
Show graph
RLB
RX
BF
RFI
TXP
PC2IP
CHAIN
CAL

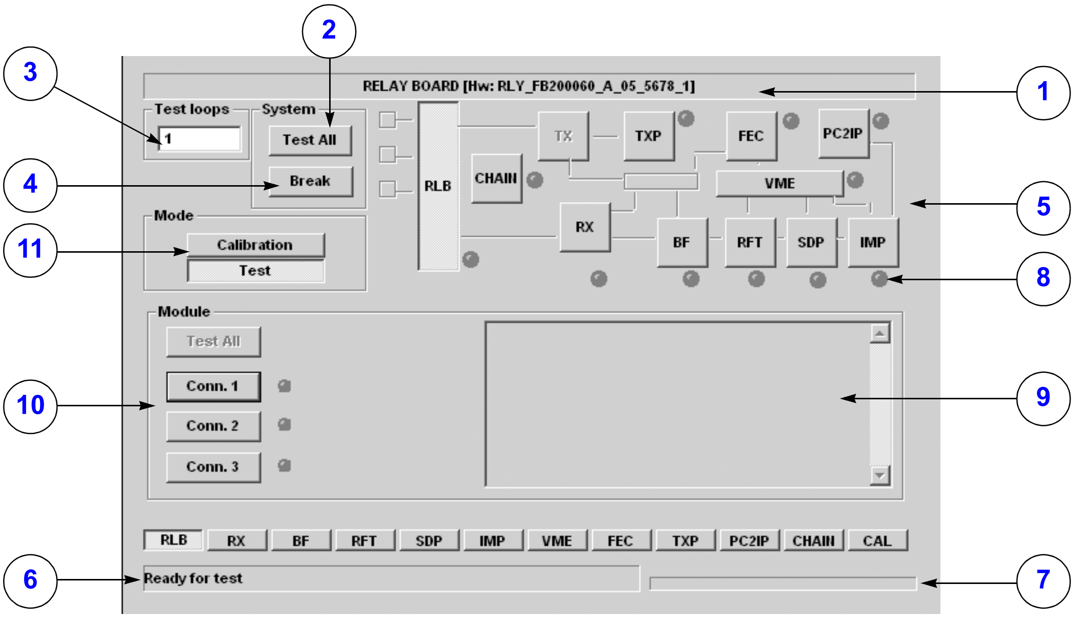
Ready for test

Press **TEST** or press one of these buttons

Figure 7-71 Select Test Window (FEP2)

The **System Test** screen (Figure 7-72/Figure 7-73) gives you access to the tests needed for troubleshooting the Front-End Card Rack.

7-8-3-2 The System Test Screen - FEP1



RELAY BOARD [Hw: RLY_FB200060_A_05_5678_1]

Test loops: 1

Ready for test

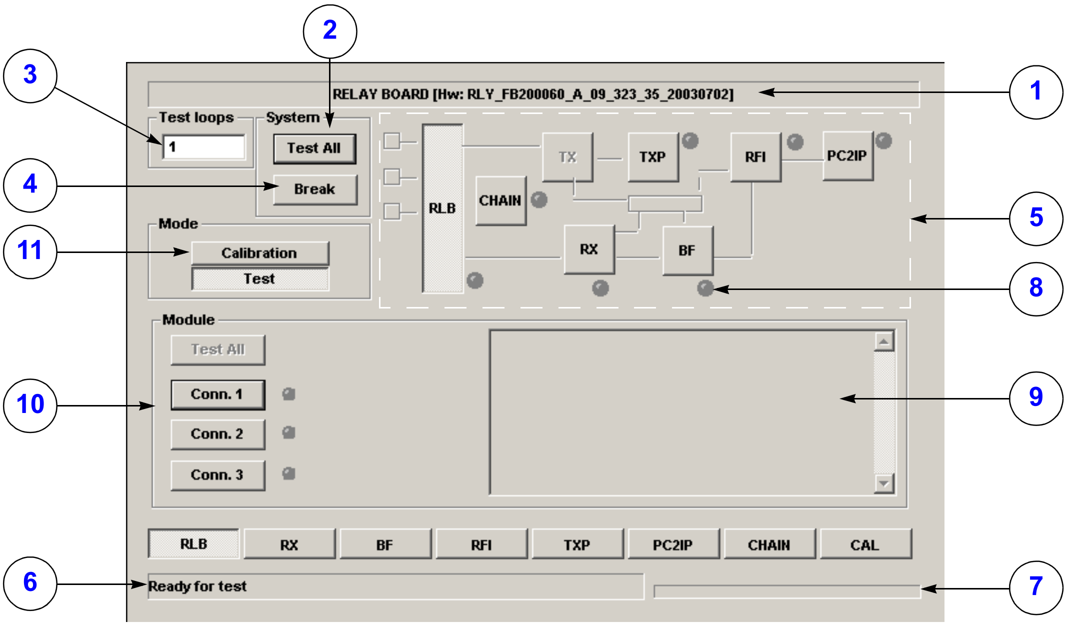
1
2
3
4
5
6
7
8
9
10
11
System
Test All
Break
Mode
Calibration
Test
TX
TXP
FEC
PC2IP
RLB
CHAIN
VME
RX
BF
RFT
SDP
IMP
Module
Test All
Conn. 1
Conn. 2
Conn. 3
RLB
RX
BF
RFT
SDP
IMP
VME
FEC
TXP
PC2IP
CHAIN
CAL

Figure 7-72 System Test Screen (FEP1)

Table 7-4 Choices on the System Test Screen on units with FEP1

ITEM	DESCRIPTION	COMMENTS
1	MODULE NAME ETC.	
2	SYSTEM:TEST ALL	See 7-8-3-5 "Test Loops, System" on page 7-69
3	TEST LOOPS	See 7-8-3-5 "Test Loops, System" on page 7-69
4	BREAK	See 7-8-3-5 "Test Loops, System" on page 7-69
5	“BLOCK DIAGRAM” WITH SINGLE TESTS	SELECT THE CARD YOU WANT TO TEST, see 7-8-3-7 "“Block Schematics” with Single Tests" on page 7-71
6	STATUS FIELD	
7	PROGRESS FIELD	
8	STATUS LIGHT	RED = FAILED, GREEN = PASSED
9	DATA FIELD	DISPLAYS INFORMATION ABOUT THE TESTS
10	MODULE SPECIFIC TESTS	SEE 7-8-3-9 "Relay Board Test" on page 7-72
11	MODE SELECT: TEST OR CALIBRATION	SELECT **CALIBRATION** TO GO TO THE CALIBRATION SCREEN, SEE 7-8-2 "Calibration Screen" on page 7-64

7-8-3-3 The System Test Screen - FEP2



RELAY BOARD [Hw: RLY_FB200060_A_09_323_35_20030702]

Ready for test

1
2
3
4
5
6
7
8
9
10
11
Test loops
1
System
Test All
Break
Mode
Calibration
Test
RLB
CHAIN
TX
TXP
RFI
PC2IP
RX
BF
Module
Test All
Conn. 1
Conn. 2
Conn. 3
RLB
RX
BF
RFI
TXP
PC2IP
CHAIN
CAL

Figure 7-73 System Test Screen (FEP2)

Table 7-5 Choices on the System Test Screen on units with FEP2

ITEM	DESCRIPTION	COMMENTS
1	MODULE NAME ETC.	
2	SYSTEM:TEST ALL	See 7-8-3-5 "Test Loops, System" on page 7-69
3	TEST LOOPS	See 7-8-3-5 "Test Loops, System" on page 7-69
4	BREAK	See 7-8-3-5 "Test Loops, System" on page 7-69
5	“BLOCK DIAGRAM” WITH SINGLE TESTS	SELECT THE CARD YOU WANT TO TEST, see 7-8-3-7 "“Block Schematics” with Single Tests" on page 7-71
6	STATUS FIELD	
7	PROGRESS FIELD	
8	STATUS LIGHT	RED = FAILED, GREEN = PASSED
9	DATA FIELD	DISPLAYS INFORMATION ABOUT THE TESTS
10	MODULE SPECIFIC TESTS	SEE 7-8-3-9 "Relay Board Test" on page 7-72
11	MODE SELECT: TEST OR CALIBRATION	SELECT **CALIBRATION** TO GO TO THE CALIBRATION SCREEN, SEE 7-8-2 "Calibration Screen" on page 7-64

7-8-3-4 System Test Screen Description

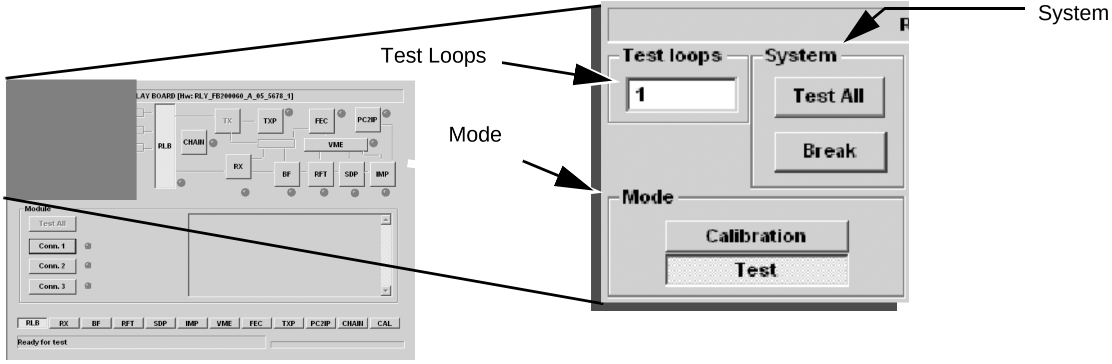

System
Test Loops
Mode
Test loops
1
System
Test All
Break
Mode
Calibration
Test
RLB
CHAIN
TX
TXP
FEC
PC2IP
VME
RX
BF
RFT
SDP
IMP
Module
Test All
Conn. 1
Conn. 2
Conn. 3
CAL
Ready for test

Figure 7-74 System Test Screen, Upper Part

7-8-3-5 Test Loops, System

Table 7-6 Test Loops, System - Test All, System - Break (FEP1)

FIELD	KEY	DESCRIPTION
TEST LOOPS	-	IN SOME CASES YOU MAY WANT TO DO THE SAME TEST SEVERAL TIMES. ENTER A NUMBER TO INDICATE HOW MANY TIMES YOU WANT THE TEST TO REPEAT ITSELF. DEFAULT VALUE = 1..
SYSTEM	**TEST ALL**	USE **TEST ALL** TO START A SEQUENCE OF ALL THE TESTS AVAILABLE IN THE TEST SCREEN. THE DIAGNOSTIC TEST IS DONE IN THIS SEQUENCE ON UNITS WITH FEP1; 1.PC2IP 2.IMP (IMAGE PORT BOARD) 3.VME (VME DATA BUS ON THE BACK PLANE) 4.SDP (SPECTRUM DOPPLER PROCESSOR) 5.RFT (RADIO FREQUENCY & TISSUE BOARD) 6.FEC (FRONT-END CONTROLLER BOARD) 7.BF (BEAMFORMER BOARDS) 8.RX (RECEIVER BOARD) 9.TXP (TX POWER) *NOTE: Relay Board (RLB) and Chain are not tested in this test.* *NOTE: The Transmitter Board (TX) don’t have its own test, but some parts of the TX board is tested during the FEC test.* *NOTE: If the system must be rebooted, do so. Continue with the testing from the point at which you were required to stop.*
SYSTEM	**BREAK**	IF YOU HAVE STARTED A LOOPED TEST, YOU MAY SELECT **BREAK** TO STOP THE TEST. THE TEST WILL CONTINUE UNTIL THE CURRENT TEST HAS FINISHED.

7-8-3-5 Test Loops, System (cont'd)

Table 7-7 Test Loops, System - Test All, System - Break (FEP2)

FIELD	KEY	DESCRIPTION
TEST LOOPS	-	IN SOME CASES YOU MAY WANT TO DO THE SAME TEST SEVERAL TIMES. ENTER A NUMBER TO INDICATE HOW MANY TIMES YOU WANT THE TEST TO REPEAT ITSELF. DEFAULT VALUE = 1..
SYSTEM	**TEST ALL**	USE **TEST ALL** TO START A SEQUENCE OF ALL THE TESTS AVAILABLE IN THE TEST SCREEN. THE DIAGNOSTIC TEST IS DONE IN THIS SEQUENCE ON UNITS WITH FEP2; 1.) PC2IP 2.) RFI (RADIO INTERFACE BOARD) 3.) BF (BEAM FORMER BOARDS) 4.) RX (RECEIVER BOARD) 5.) TXP (TX POWER) *NOTE: Relay Board (RLB) and Chain are not tested in this test.* *NOTE: The Transmitter Board (TX) don't have its own test, but some parts of the TX board is tested during the FEC test.* *NOTE: If the system must be rebooted, do so. Continue with the testing from the point at which you were required to stop.*
SYSTEM	**BREAK**	IF YOU HAVE STARTED A LOOPED TEST, YOU MAY SELECT **BREAK** TO STOP THE TEST. THE TEST WILL CONTINUE UNTIL THE CURRENT TEST HAS FINISHED.

7-8-3-6 Mode (Calibration/Test Screen Selection)

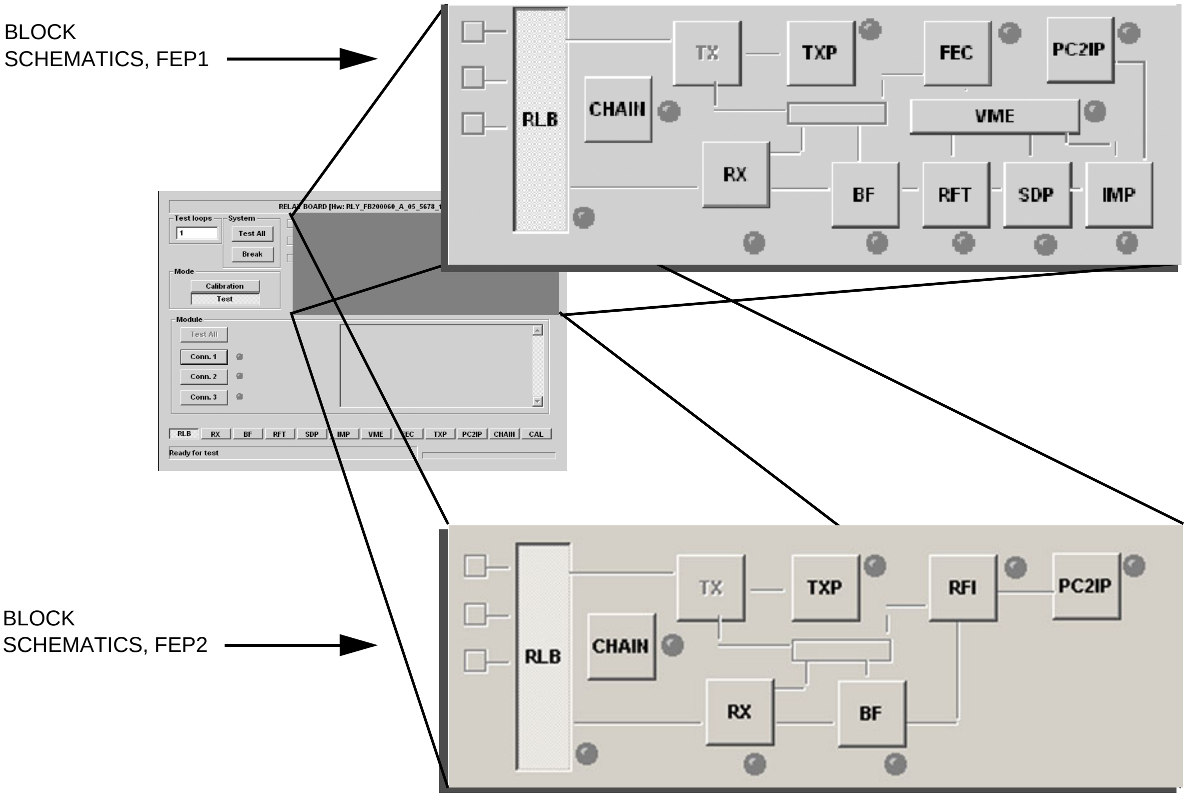
Table 7-8 Mode (Calibration/Test Screen selection)

FIELD	KEY	DESCRIPTION
MODE		The buttons in this field are used to select the Calibration Screen or the Test Screen.
	Calibration	Select this button to select the Calibration Screen.
	Test	Select this button to select the Test Screen.

7-8-3-7 "Block Schematics" with Single Tests

Select one of the buttons in the "block schematics" in the upper part of the screen (or one of the duplicate buttons in the lower row of the screen) to select a particular test.

Some of the tests are described after the figure below.


BLOCK SCHEMATICS, FEP1
RLB
CHAIN
TX
TXP
FEC
PC2IP
VME
RX
BF
RFT
SDP
IMP
RELAY BOARD [Hw: RLY_FB200060_A_05_5678_1
Test loops
System
Test All
Break
Mode
Calibration
Test
Module
Test All
Conn. 1
Conn. 2
Conn. 3
RLB
RX
BF
RFT
SDP
IMP
VME
FEC
TXP
PC2IP
CHAIN
CAL
BLOCK SCHEMATICS, FEP2
RLB
CHAIN
TX
TXP
RFI
PC2IP
RX
BF

Test loops: 1

Ready for test

Figure 7-75 Diagnostics Test Screen, Upper Part

7-8-3-8 Receiver Board (RX) Test

Table 7-9 Receiver Board (RX) Test

Test (Key)	Sub-tests	Description
RX		**Receiver Board (RX)**
	Test All	Activates the following tests, in sequence, see description for each sub test; - RECV0 - RECV1
	RECV.0	Max Gain test for RX using FEC signal generator.
	RECV.1	Reduced Gain test for RX using FEC signal generator.

7-8-3-9 Relay Board Test

NOTE: A Test Attenuator, Part Number AA200215 is needed for this test.

Table 7-10 Relay Board (RLB) Test

Test (Key)	Sub-tests	Description
RLB		**Relay Board (RLB)**
	Test All	Activates the following tests, in sequence (see the descriptions for the tests below); 1. Conn. 1 2. Conn. 2 3. Conn. 3
	Conn. 1	Max Gain test for RX using the signal generator on the Front-End Controller (FEC) and a Test Attenuator, Part Number AA200215, in left (active) probe connector.
	Conn. 2	Max Gain test for RX using the signal generator on the Front-End Controller (FEC) and a Test Attenuator, Part Number AA200215, in mid (active) probe connector.
	Conn. 3	Max Gain test for RX using the signal generator on the Front-End Controller (FEC) and a Test Attenuator, Part Number AA200215, in right probe connector.

7-8-3-10 Image Port Test

When selecting the ImagePort Test, the scanner issues a test command to the local software running on the I960RP processor on the Image Port board.

The test command will start the following tests;

- test the interrupt based command/replay mechanism
- reset the ImagePort board
- test the PipeLink data fifo
- test the video data fifos
- test the PipeLink control fifo
- test the video control fifo
- test the video grabber chip

Results;

- Green light: - OK
- Red light: - Failed

7-8-3-11 Chain (Signal Chain, RLB/RX/BF Test)

NOTE: A Test Attenuator, Part Number AA200215 is needed for this test.

Table 7-11 Signal Chain (TX/RLB/RX/BF) Test

Test (Key)	Sub-tests	Description
Chain		**Signal Chain Test (Chain)** The Signal Chain/ Data Flow test checks for errors in the TX, RLY, RX and BF chain of data flow.
	Test All	Not Used.
	TX/RLB/RX/ BF	Tests data flow in Front-End Transmit Receive signal chain. If an error occurs with this test, testing should be continued in the following order; 1. BF digital and analog test 2. RX test 3. RLY test.

Remember to restart the Vivid 7 after the diagnostics session.

,

7-8-4 General Recommendations to Troubleshoot Noise Issues

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. They also generate EMI. The Vivid 7 complies with limits as stated on the EMC label. However there is no guarantee that interference will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. Some of these sources include:

- medical lasers
- scanners
- cauterizing guns
- computers
- monitors
- fans
- gel warmers
- microwave ovens
- light dimmers
- portable phones

The presence of a broadcast station or broadcast van may also cause interference.

7-8-5 EMI Prevention/abatement

Table 7-12 EMI Prevention/abatement

EMI RULE	DETAILS
BE AWARE OF RF SOURCES	- Keep the unit at least 5 meters (15 feet) away from other emi sources. - Special shielding may be required to eliminate interference problems caused by high frequency, - High powered radio or video broadcast signals.
GROUND THE UNIT	- Poor grounding is the most likely reason a unit will have noisy images. - Check grounding of the power cord and power outlet.
REPLACE ALL SCREWS, RF GASKETS, COVERS, CORES	- After you finish repairing or updating the system, replace all covers and tighten all screws. - Any cable with an external connection requires a magnet wrap at each end. - Install the card rack cover over the card rack. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
REPLACE BROKEN RF GASKETS	- If more than 20% or a pair of the fingers on an rf gasket are broken, replace the gasket. - Do not turn on the unit until any loose metallic part is removed.
DO NOT PLACE LABELS WHERE RF GASKETS TOUCH METAL	Never place a label where rf gaskets meet the unit. otherwise, the gap created will permit rf leakage. or, if a label has been found in such a position, move the label.
USE GE SPECIFIED HARNESSES AND PERIPHERALS	- The interconnect cables are grounded and require ferrite beads and other shielding. - Also, cable length, material, and routing are all important; do not change from what is specified.
TAKE CARE WITH CELLULAR PHONES	Cellular phones may transmit a 5 v/m signal; that could cause image artifacts.
PROPERLY DRESS PERIPHERAL CABLES	Do not allow cables to lie across the top of the card rack or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. attach the monitor cables to the frame.

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Chapter 8
Replacement Procedures

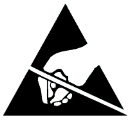
Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter holds replacement procedures for the following modules/subsystems.

NOTE: Use the ESD-kit during replacing boards.

WARNING ***DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:***



ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED AT THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

WARNING ***THE WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT MUST NOT BE DISPOSED AS UNSORTED MUNICIPAL WASTE AND MUST BE COLLECTED SEPARATELY.***

PLEASE CONTACT THE MANUFACTURER OR OTHER AUTHORIZED DISPOSAL COMPANY TO DECOMMISSION YOUR EQUIPMENT.

8-1-2 Definitions of Left, Right, Front and Back

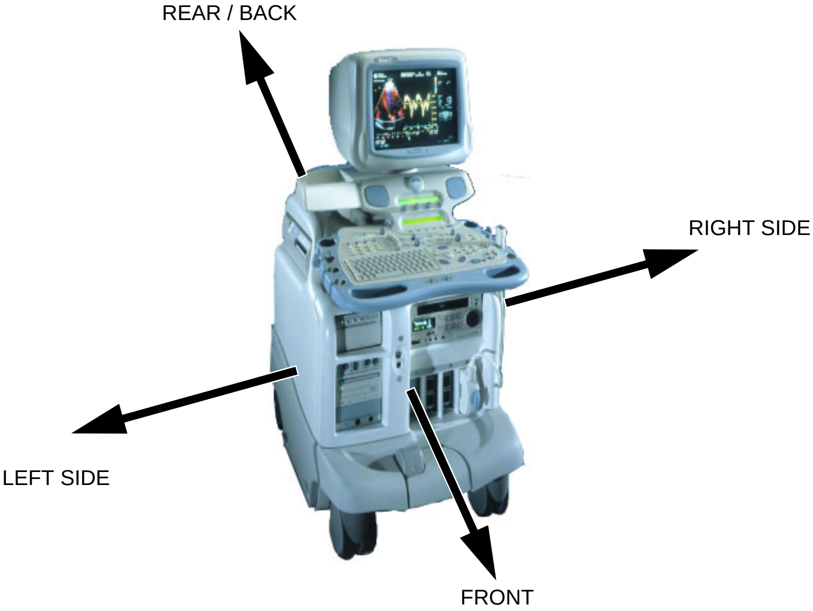

REAR / BACK
RIGHT SIDE
LEFT SIDE
FRONT

Figure 8-1 Definition of Left, Right, Front and Back of Vivid 7

8-1-3 Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEHC policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEHC employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe). The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purposes and must be transported as a hazardous material.

8-1-4 Warnings

⚠ **WARNING** ***BECAUSE OF THE LIMITED ACCESS TO CABINETS AND EQUIPMENT IN THE FIELD, PLACING PEOPLE IN AWKWARD POSITIONS, WE HAVE LIMITED THE LIFTING WEIGHT FOR ONE PERSON IN THE FIELD TO 16 KG (35 LBS). ANYTHING OVER 16 KG (35 LBS) REQUIRES TWO PEOPLE.***

⚠ **WARNING** ***AT LEAST TWO PERSONS ARE NEEDED WHEN REPLACING HEAVY PARTS LIKE THE MONITOR, THE FROGLEG AND THE AC TRANSFORMER.***

⚠ **WARNING** ***AT LEAST TWO PERSONS ARE NEEDED WHEN REPLACING CASTERS (WHEELS) OR ADJUSTING BRAKES.***

Section 8-2
Side Covers (with Bumpers) Replacement Procedure

8-2-1 Manpower

One person, 5 minutes

8-2-2 Tools

Large coin and a large screwdriver

8-2-3 Preparations

Power off / Shutdown the system, see 4-2-3 "Power Shut Down" on page 4-7.

8-2-4 Side Covers Removal Procedure

1.) Use a large coin to turn the two recessed fasteners at the bottom of the side cover a quarter turn to the horizontal position.
2.) Take hold under the lower front side of cover and pull gently. At the same time support the rear side of the cover with the other hand.

NOTE: *The two fasteners hold the left-side cover to the scanner at the bottom of the card cage cover. The two fasteners hold the right-side cover to the scanner at the bottom of the AC power supply wall.*

3.) When the cover is loose in front, pull the rear out and move upwards.
4.) Lift the side cover gently upwards until the three hooks at the top of the side cover are free from the three retainer slots in the top cover as shown in Figure 8-2.
5.) To Remove Left side cover, repeat this procedure.

NOTE: Figure 8-2 *shows the right-side cover being removed. Repeat the same steps listed above to remove the left-side cover.*

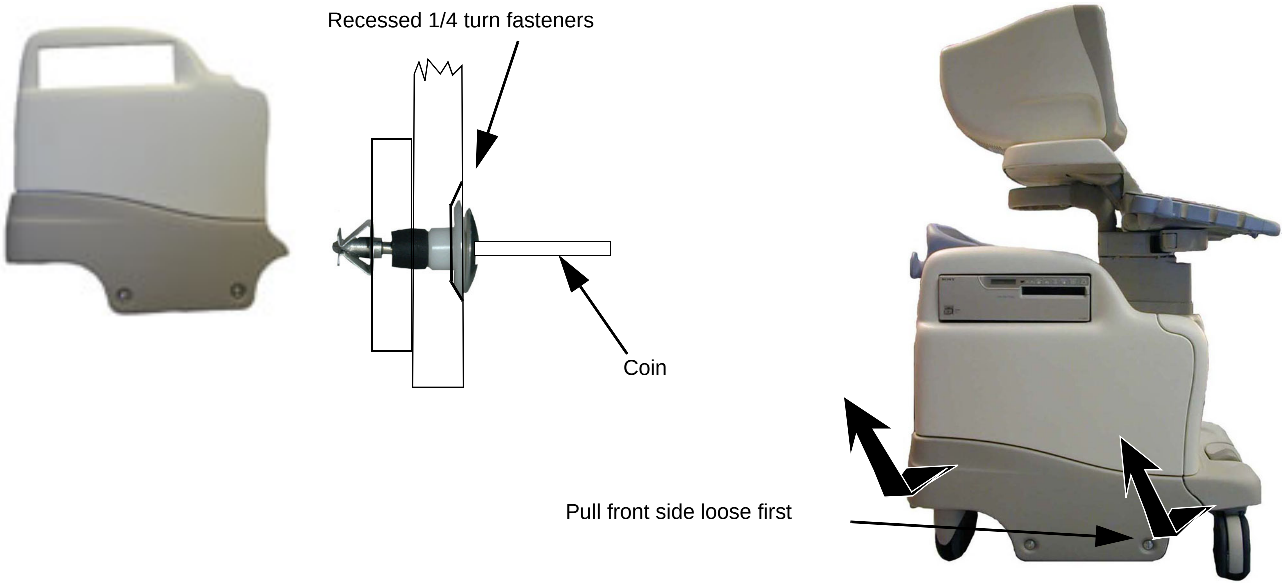


Figure 8-2 Removal of Side Covers

8-2-5 Side Covers Installation Procedure

1.) Guide the top edge of the side cover so the hooks rest in the top cover retainer slots.

2.) Push back side in first position so it is locked in Lower Rear Cover.

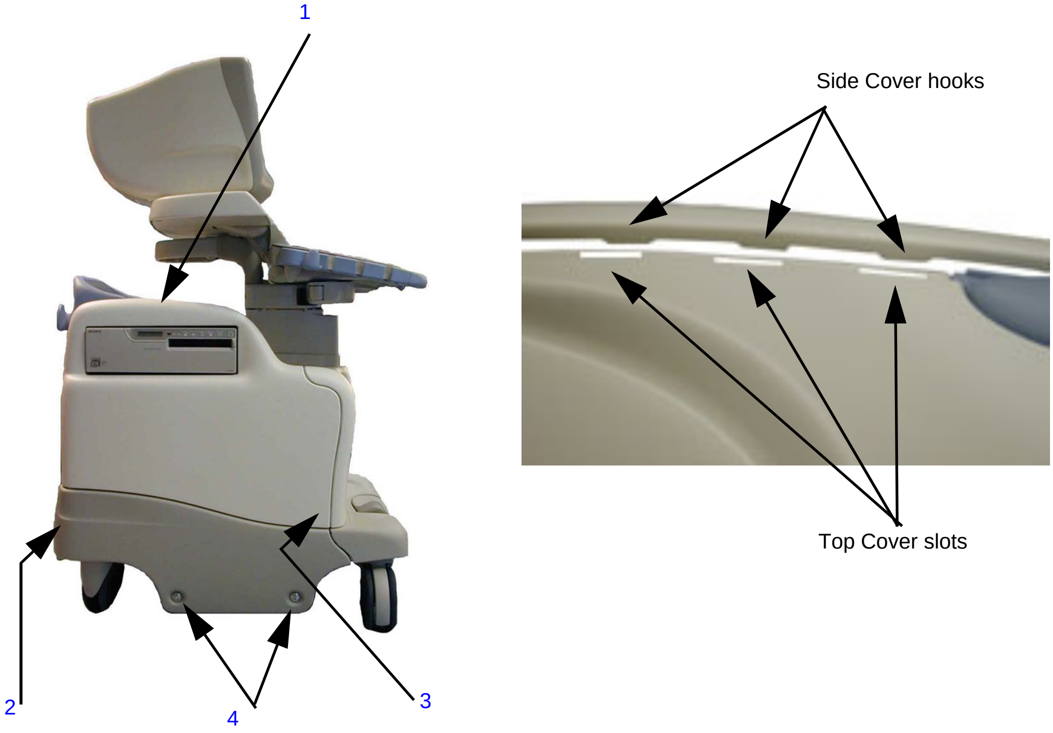


Figure 8-3 Side Cover installment

3.) Push the front side in position so it is locked in Front Cover.

4.) With a large coin, turn the two bottom fasteners to the vertical position.Now, using a large screwdriver, push in on these fasteners to lock them in place.

8-2-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-3
Upper Rear Cover (Filter Cover) Replacement Procedure

8-3-1 Manpower

One person, 5 minutes

8-3-2 Tools

No special tools needed

8-3-3 Upper Rear Cover Removal Procedure

Take hold at the lower side of Filter Cover and pull it loose from the chassis. Hook it off at the upper side and remove it.

8-3-4 Upper Rear Cover Installation Procedure

Align the cover at the upper side and push it into place along its lower side.

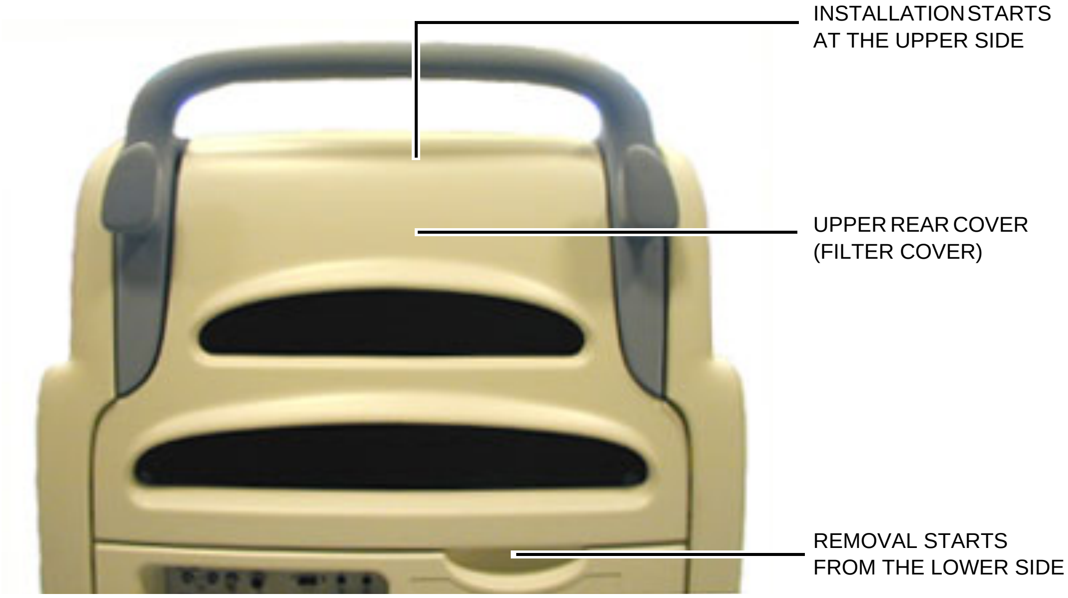

INSTALLATION STARTS
AT THE UPPER SIDE
UPPER REAR COVER
(FILTER COVER)
REMOVAL STARTS
FROM THE LOWER SIDE

Figure 8-4 Filter Cover

8-3-5 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-4
Front Cover Replacement Procedure

8-4-1 Manpower

One person, 30 minutes

8-4-2 Tools

Phillips screwdriver

8-4-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Disconnect all Probes and I/O cabling. See User manual.
3.) Remove Side Covers, see "Side Covers Removal Procedure" on page 8-4.

8-4-4 Front Cover Removal Procedure

1.) Unscrew five (5) Phillips screws that fasten it to the chassis.
2.) Pull it outwards to free it from the Top Cover and Front Bumper (See Figure 8-5).

8-4-5 Front Cover Installation Procedure

1.) Thread the same, or a new, cover so it fits in between chassis and bumper (See Figure 8-5).
2.) Thread it so it links together with Top Cover. You may have to loosen two (2) Phillips screws on the top cover that are closest to the Front cover.
3.) Fasten Front Cover with five (5x) Phillips screws.
4.) Fasten two (2x) Phillips screws on Top Cover if these were loosened.
5.) Install Side Covers, see 8-2-5 "Side Covers Installation Procedure" on page 8-5.
6.) New Front Cover: Install correct labels, see Section 1-5 "Labels Locations" on page 1-20.

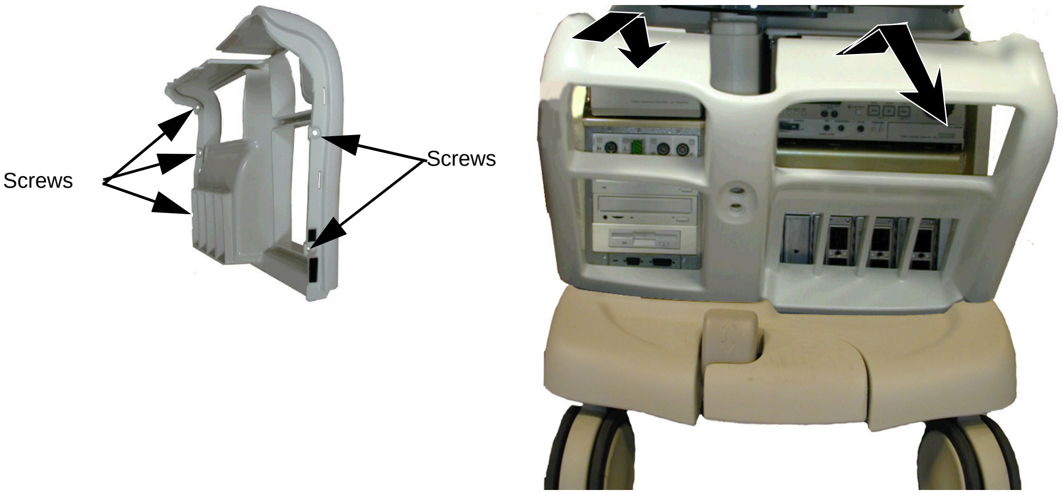


Figure 8-5 Front Cover Replacement

8-4-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-5
Air Filter Replacement Procedure

8-5-1 Manpower

One person, 30 minutes

8-5-2 Tools

No special tools are needed

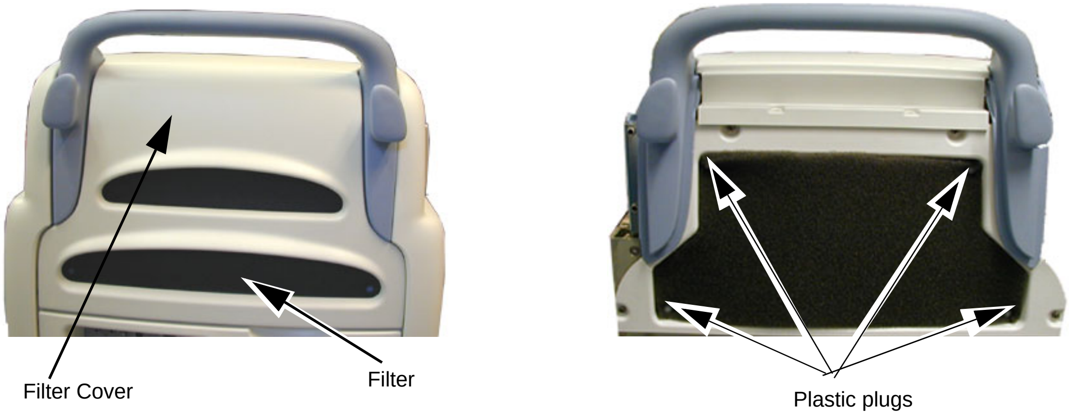


Figure 8-6 Filter Cover and Filter

8-5-3 Filter Removal Procedure

1.) Remove Filter Cover, see 8-3-3 "Upper Rear Cover Removal Procedure" on page 8-6.
2.) Pull out plastic plugs and remove the filter.

8-5-4 Filter Installation Procedure

Two different Plastic plugs have been used, see Figure 8-7 - Plug replacement, the one to the left on early Vivid 7 scanners and the type to the right on newer units (both Vivid 7 and Vivid 7 PRO).

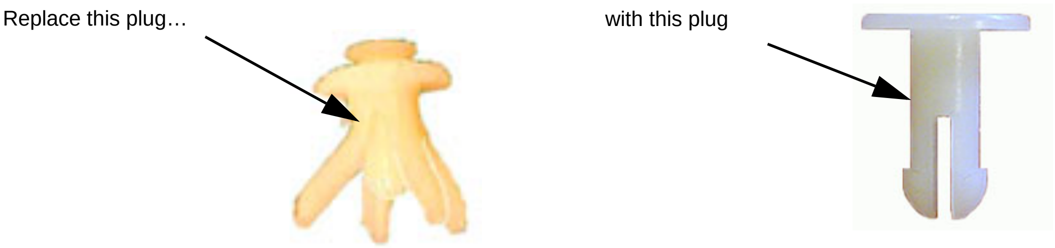


Figure 8-7 Plug replacement

1.) Install a new or a cleaned filter (GE Vingmed Part No: FB307903).
Use plastic plugs as shown to the right in Figure 8-7 - Plug replacement. (GE Vingmed Part Number for the plastic plug is: 080X6520.)
2.) Install Filter Cover, see "Upper Rear Cover Installation Procedure" on page 8-6.

8-5-5 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-6
Lower Rear Cover Replacements Procedure

8-6-1 Manpower

One person, 30 minutes

8-6-2 Tools

Phillips screwdriver size 2

8-6-3 Preparations

Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.

8-6-4 Lower Rear Cover Removal Procedure

1.) Remove Filter Cover shown in "Upper Rear Cover Removal Procedure" on page 8-6.

2.) Remove both Side Covers, see "Side Covers Removal Procedure" on page 8-4.

3.) Unscrew two (2) screws with magnetic lock (part number 080X1200) for Filter Cover. Left screw contains also 3 or 4 washers (080C2053), right screw 5 or 6 washers, depending on thickness of Lower Rear Cover.

4.) Unscrew four (4) remaining Phillips screws that fasten Lower Rear Cover to the chassis (See Figure 8-5).

5.) Remove Lower Rear Cover.

8-6-5 Lower Rear Cover Installation Procedure

1.) Align Lower Rear Cover with the chassis and fasten it with eight (8) Phillips screws.

2.) Install Filter Cover, see "Upper Rear Cover Installation Procedure" on page 8-6 and Side Covers, see "Side Covers Installation Procedure" on page 8-5.

3.) New Lower Rear Cover: Install correct label, see Section 1-5 "Labels Locations" on page 1-20.

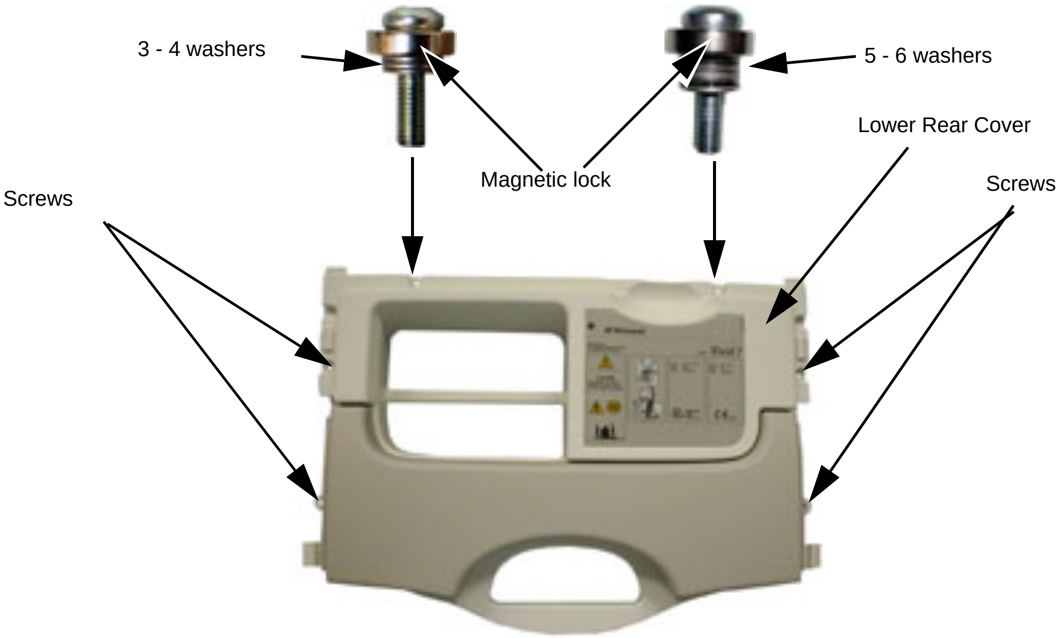


Figure 8-8 Lower Rear Cover Fastening Locations.

8-6-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-7
Software Loading Procedure - Software Version v7.x, v6.x, v5.x and v4.x

⚠ **NOTICE** Do not use this procedure when *upgrading* a unit's software. Additional software and procedures, not described here, may be needed for such upgrades.
Use this procedure if you need to reinstall the existing software on a Vivid 7.

8-7-1 Introduction

⚠ **NOTICE** In order to complete a successful restore of the Patient Database, if needed, the images must be moved to MO disks *before* doing backup of Patient Database. If the backup procedure is not completed correctly, the images and database information could be lost.

8-7-2 Preparations Before Software Re-installation

- Export Patient Images from the internal hard disk to removable removable media.
- Make backup of Customer Presets, Patient Database (Patient Archive, Report Archive, System Configuration and User Defined Configuration) to a removable media.
- TCP/IP Addresses, Computer Name and Software Option Password (alphanumeric string) settings must be manually recorded.

8-7-3 Customer Provided Prerequisite

- Formatted and labelled removable media for Images storage
- Formatted and labelled removable media for Patient Archive and User Defined Settings.

8-7-4 Tools Provided With Unit or After an Upgrade

Table 8-1 Software used on BT'08 (Software Version v7.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY
1	VIVID 7 WITH BEP4.3, SYSTEM SW CD	FD200078	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
2	VIVID 7 WITH BEP4.2, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD)	
3	VIVID 7 WITH BEP3.x, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD)	
4	VIVID 7 AND ECHOPAC PC APPLICATION SOFTWARE V.7.0.0	FD200110	Application Software Installation CD, Disk 2 of 2, v7.x.x	1

Table 8-2 Software used on BT'06 (Software Version v6.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY
1	VIVID 7 WITH BEP4.x, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
2	VIVID 7 WITH BEP3.x, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
3	APPLICATION CD	FC200885	Application Software Installation CD, Disk 2 of 2, v6.x.x	1
4	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v6.1.x (THIS CD ALSO INCLUDE SOFTWARE v4.2.x and v5.2.x)	

Table 8-3 Software used on BT'05 (Software Version v5.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY
1	VIVID 7 WITH BEP3.2, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
2	VIVID 7 WITH BEP4.x, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
3	APPLICATION CD	FC200689	Application Software Installation CD, Disk 2 of 2, v5.0.x and v5.1.x	1
4	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v5.2.x (THIS CD ALSO INCLUDE SOFTWARE v4.2.x and v6.1.x)	

Table 8-4 Software used on BT'04 (Software Version v4.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY
1	VIVID 7 WITH BEP3, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
2	VIVID 7 WITH BEP4.x, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD)	1
3	APPLICATION CD	FC200569	Application Software Installation CD, Disk 2 of 2 Software v4.0.x and v4.1.x	1

Table 8-4 Software used on BT'04 (Software Version v4.x)(cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY
4	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v4.2.x (THIS CD ALSO INCLUDE SOFTWARE v5.2.x and v6.1.x)	

8-7-5 Preparations

1.) Switch ON the Mains Power Circuit Breaker and power up the unit, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

2.) Store images to removable media , see 8-7-7 "Backup - Software Version v7.x/v6.x/v5.x/v4.x" on page 8-17.

8-7-6 Move Images - Software Version v7.x/v6.x/v5.x/v4.x

For general information, please refer to the *Disk management* description in the Vivid 7 User Manual.

8-7-6-1 Configure the Disk Management Function

NOTE: *Configuration of the Disk management system can only be done by user with administration rights.*

1.) Press **Config (F2)**.

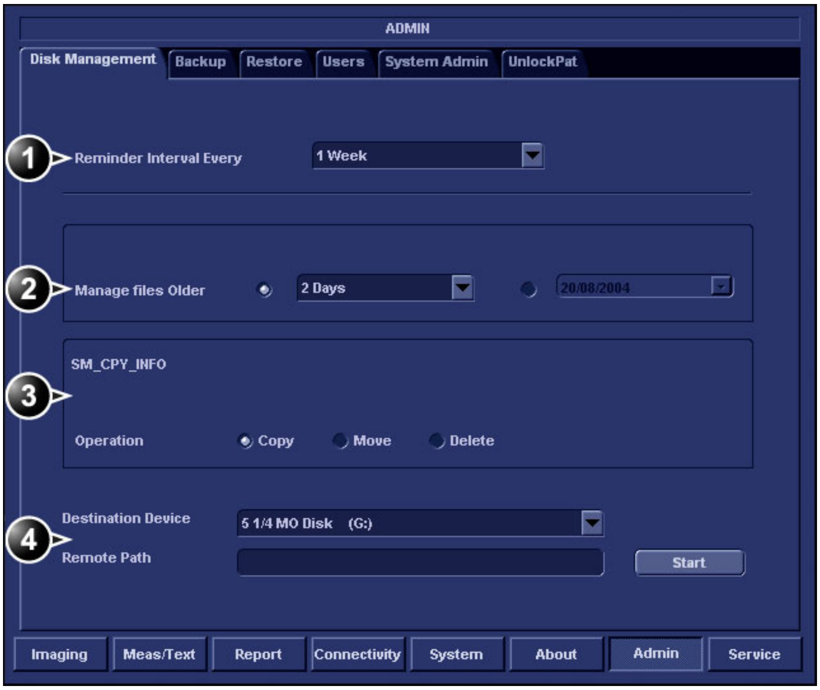
2.) Log on as **ADM** (administrator).

- Password, software v6.x and later: **ulsadm**
- Password, software v5.x and earlier: notthing (leave empty).

NOTE: *If the passwords above don't function, please ask the customer for the correct password.*

3.) Select the category **Admin**.

4.) In the **Admin** category, select the **Disk Management** tab.



Reminder Interval Every: 1 Week

Manage files Older: ● 2 Days ○ 20/08/2004

SM_CPY_INFO

Operation: ● Copy ○ Move ○ Delete

Destination Device: 5 1/4 MO Disk (G:)

Remote Path:

1. **Sets the reminder time interval for running Disk management.**
2. **Sets the files to be managed based on the examination dates.**
3. **Sets the Disk management to copy, move or delete images.**
4. **Sets the destination device.**

Figure 8-9 Disk Management

8-7-6-2 Disk Management Schedule Setting

- Next to **Reminder interval**, specify the number of days/weeks you want the system to prompt you to perform disk management.

  This setting should be set based on the activity of your office/institution. If **None** is selected, no reminder will be displayed.

8-7-6-3 Data Management Settings

1.) Select a number of days, weeks or months or a specific date next to **Manage files older than**.

Only files older than the specified setting will be copied or moved.

If **none** is selected, all files will be copied or moved.

2.) Next to **Operation** check:

- **Copy**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination. Using this setting, the files will exist in two locations, the local hard drive and the media used to copy to.
- **Move**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination, verified and then deleted from the local hard drive. Using this setting, the files will exist in one location, the media used to move the files to. They are removed from the local hard drive.
- **Delete**: the images and reports from the examinations older than the specified setting defined in step 1 are deleted from the hard drive.

8-7-6-4 Destination Device Setting

- Next to **Destination device**, select a removable media or a network shared folder.

*NOTE: To be able to select a network shared folder in the Destination device field, its path must have been entered once in the field next to **Remote path**.*

NOTICE If using removable media, it is recommended to use dedicated media to the Disk Management process. Removable media used for data backup must not be used when performing Disk Management.

Do not use the same removable media on several systems.

8-7-6-5 Running the Disk Management Function

The **Disk Management** function can be run at any time. In addition, the user may be prompted to run **Disk Management** if the time since the last **Disk Management** operation performed has reached the setting for the **Reminder Interval**, or if the local hard drive is about to be full.

8-7-6-6 Manual Start of Disk Management

1.) Press **Archive** on the **Operator Panel**.
The **Search/Create patient window** is displayed.

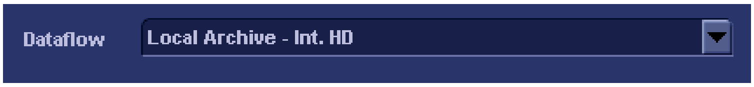
2.) Press **More** in the **Search/Create patient window** to display additional menu options and select **Disk management**.

8-7-7 Backup - Software Version v7.x/v6.x/v5.x/v4.x

1.) Press **Archive**. The **Operator login** window is displayed.

2.) Log on as **Adm**. The **Search/Create patient** window is displayed.

3.) In the **Search/Create patient** window, select the dataflow **Local Archive - Int. HD**.



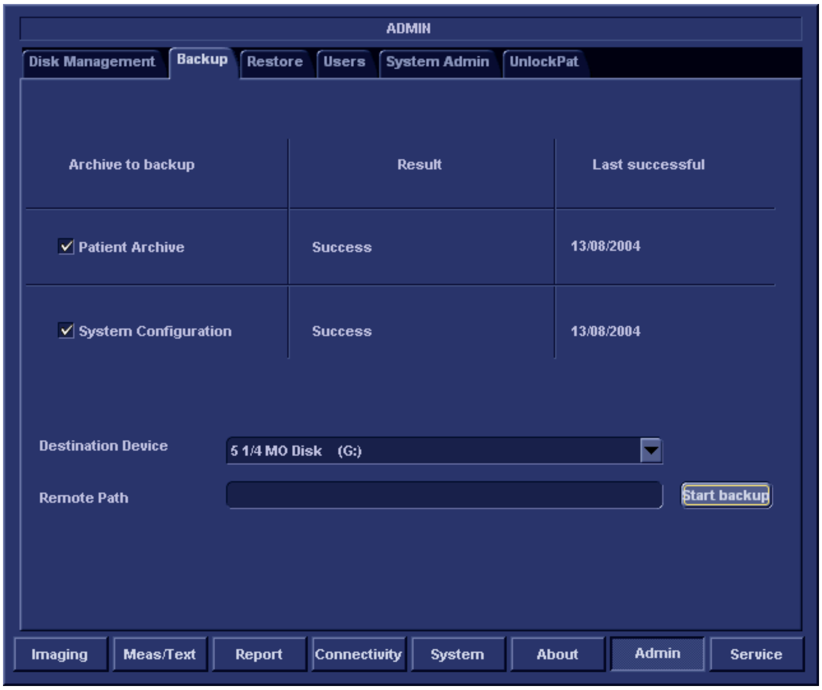
Dataflow: Local Archive - Int. HD

Figure 8-10 Dataflow selection for backup

4.) Press **Config (F2)**.

5.) Select **Admin**.

6.) Select the **Backup** tab.



ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat

Archive to backup	Result	Last successful
☑ Patient Archive	Success	13/08/2004
☑ System Configuration	Success	13/08/2004

Destination Device: 5 1/4 MO Disk (G:)

Remote Path:

Start backup
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Figure 8-11 The Backup tab

7.) In the **Backup** sheet select as needed:
   - **Patient Archive** to backup the patient records.
   - **System Configuration** to copy system settings and user presets.

8.) Select a removable media or a shared network folder as destination.

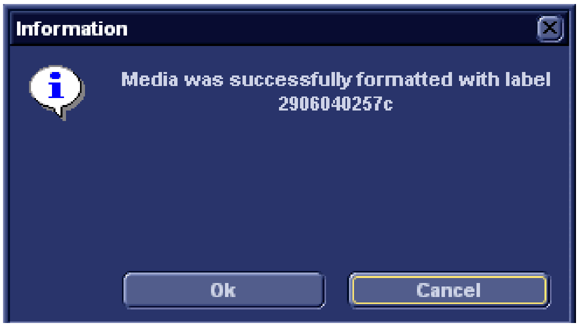
NOTE: To be able to select a shared network folder, the path (of type: ***\\server-name\share-name****) must be entered once in the* ***Remote Path*** *field.*

9.) If the backup is done to a removable media, insert a dedicated media in the drive.

8-7-7 Backup - Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

10.) Select **Start backup**. The following situations may occur:

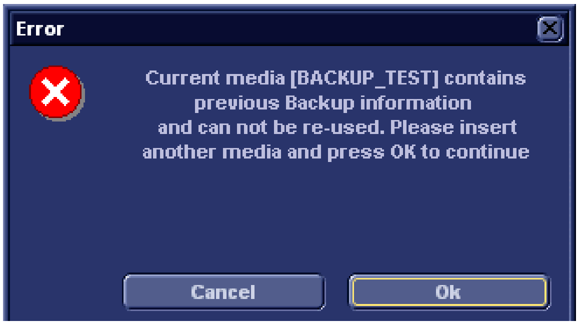
- The system is checking that the removable media is inserted. If not, a dialogue window is displayed prompting the user to insert a media.



Media was successfully formatted with label 2906040257c

Figure 8-12 The information window

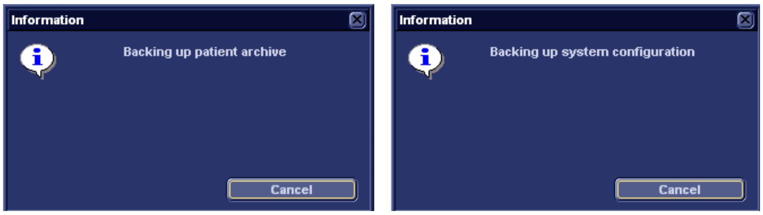
- Insert the media and select **OK**.
- The system is checking if the media needs to be formatted. If yes, the media is automatically formatted. An Information window is displayed showing the media label.



Current media [BACKUP_TEST] contains previous Backup information and can not be re-used. Please insert another media and press OK to continue

Figure 8-13 The replace current media window

- Record the label and select **OK**.
- The system is checking if there is already a backup or a Disk management copy on the media. If the following error message is displayed, the disk is ejected and the user is asked to use a new media that does not contain any backup or Disk management data.



Backing up patient archive

Backing up system configuration

Figure 8-14 The backup progress windows

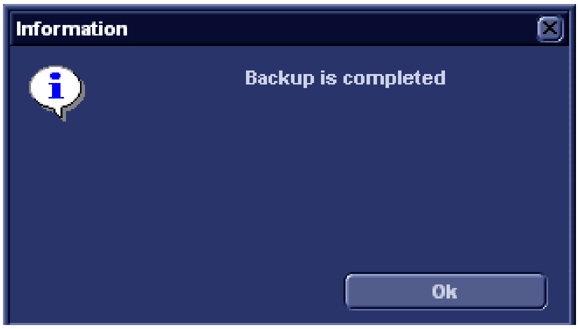
8-7-7 Backup - Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

- Insert a new media and select **OK**.

NOTE: *To reuse a Backup media when performing a new archive backup, the media has to be re-formatted first.*

11.) During backup, progress windows are displayed showing the current operation being performed.

12.) At the end of the process, the media is ejected and the **Backup completed** window is displayed.

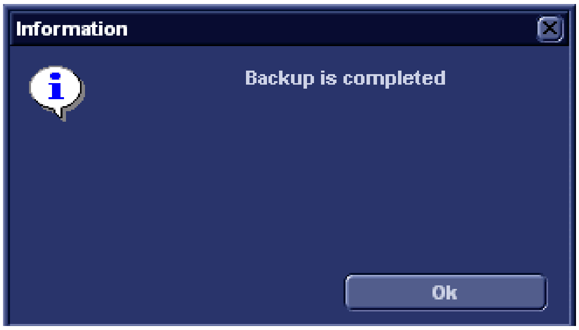


Information

Backup is completed

Figure 8-15 The backup completed window

13.) Select **OK**. The Backup result is displayed on the Backup sheet.



Information

Backup is completed

Figure 8-16 The backup result

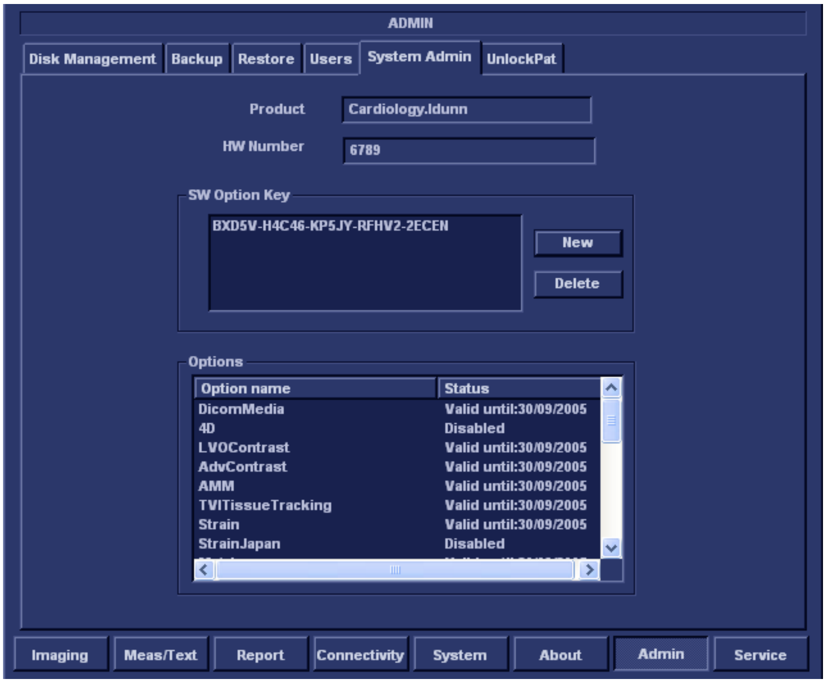
14.) Make sure to physically label the media. An identification of the system should also be noted on the media and a backup log should be kept. File the media in a safe place.

8-7-8 Record SW Option Keys - Software Version v7.x/v6.x/v5.x/v4.x

1.) Press CONFIG (F2) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **Admin** from the lower part of the screen.

3.) Select the **System Admin** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat
SW Option Key
New
Delete
Options
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Product: Cardiology.ldunn

HW Number: 6789

SW Option Key: BXD5V-H4C46-KP5JY-RFHV2-2ECEN

Option name	Status
DicomMedia	Valid until:30/09/2005
4D	Disabled
LVOContrast	Valid until:30/09/2005
AdvContrast	Valid until:30/09/2005
AMM	Valid until:30/09/2005
TVITissueTracking	Valid until:30/09/2005
Strain	Valid until:30/09/2005
StrainJapan	Disabled

Figure 8-17 System Admin

4.) Record the SW Options Key(s) - alphanumeric string - from the SW Options Key window.

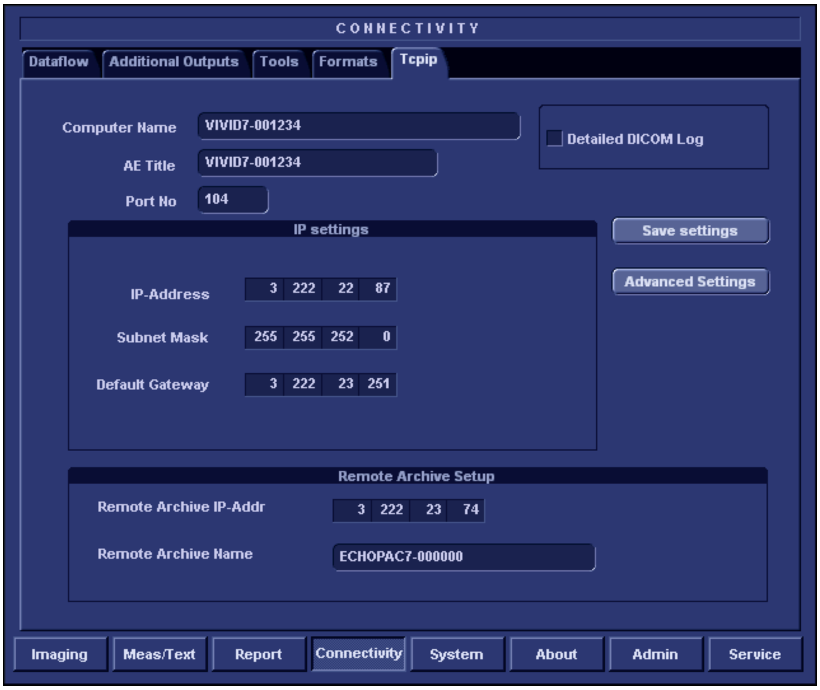
WARNING ***Make sure that the SW Option Keys (passwords) have been recorded correctly. If the key is incorrect, you will not be able to log on after the SW installation has been completed. The password is case sensitive. Hyphens must also be recorded. There may be more than one password.***

Table 8-5 SW Options Keys - Software Version v7.x/v6.x/v5.x/v4.x

SW OPTIONS KEYS

8-7-9 Record TCP/IP Settings - Software Version v7.x/v6.x/v5.x/v4.x

1.) Select **Connectivity**.
2.) Select the **TCPIP** tab.
3.) Record all settings in Table 8-6 "Record settings from Tcpip screen - software version v7.x/v6.x/v5.x/v4.x" on page 8-21.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Advanced Settings
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Computer Name VIVID7-001234
AE Title VIVID7-001234
Port No 104
☐ Detailed DICOM Log

IP settings
IP-Address 3 222 22 87
Subnet Mask 255 255 252 0
Default Gateway 3 222 23 251

Remote Archive Setup
Remote Archive IP-Addr 3 222 23 74
Remote Archive Name ECHOPAC7-000000

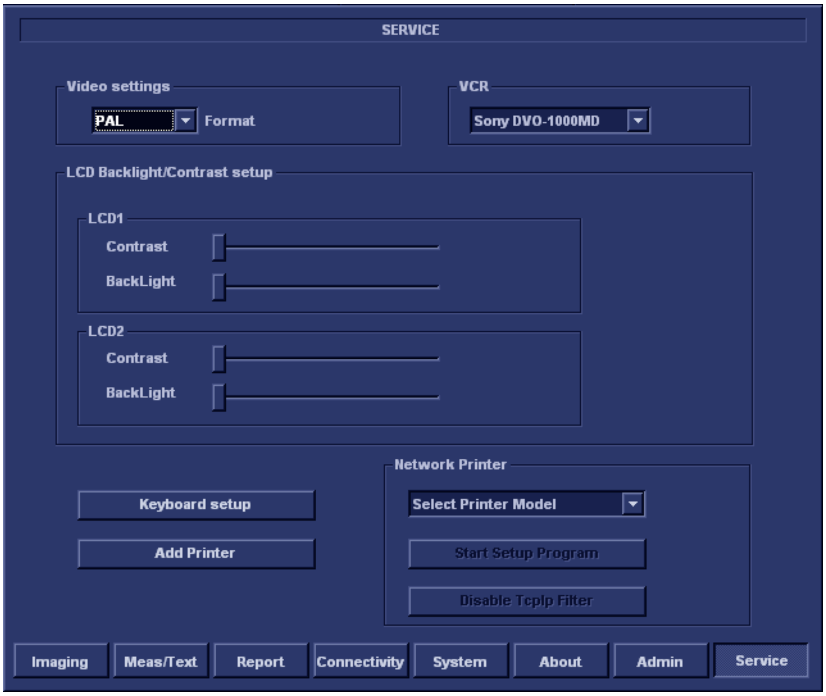
Figure 8-18 TCP/IP Example Settings

Table 8-6 Record settings from Tcpip screen - software version v7.x/v6.x/v5.x/v4.x

PARAMETER	VALUE
Computer Name	VIVID7-00 _ _ _ _
AE Title	VIVID7-00 _ _ _ _
PORT NO	
IP Settings	
IP Address	_ _ _ . _ _ _ . _ _ _
Subnet mask	_ _ _ . _ _ _ . _ _ _
Default Gateway	_ _ _ . _ _ _ . _ _ _
Remote Archive Setup	
Remote Archive IP-Addr	_ _ _ . _ _ _ . _ _ _
Remote Archive Name	

8-7-10 Record Service Settings - Software Version v7.x/v6.x/v5.x/v4.x

1.) Select **Service**.



Video settings: PAL Format

VCR: Sony DVO-1000MD

SERVICE
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Network Printer
Select Printer Model
Keyboard setup
Add Printer
Start Setup Program
Disable TcpIp Filter
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Figure 8-19 Service Settings

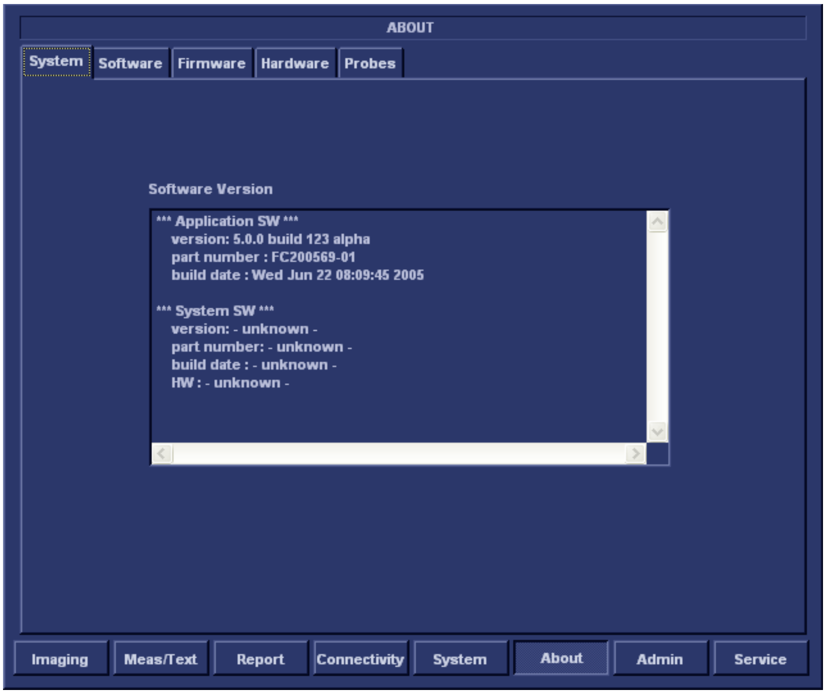
2.) Record Video Setting Format and VCR Type in Table 8-7 "Video Setting and VCR type - Software Version v7.x/v6.x/v5.x/v4.x" on page 8-22.

Table 8-7 Video Setting and VCR type - Software Version v7.x/v6.x/v5.x/v4.x

VIDEO SETTING FORMAT	SELECTED VCR MODEL
___PAL ___NTSC	

8-7-11 Record Software Versions - Software Version v7.x/v6.x/v5.x/v4.x

1.) Select the **About** tab.


ABOUT
System
Software
Firmware
Hardware
Probes
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Software Version

```
*** Application SW ***
   version: 5.0.0 build 123 alpha
   part number : FC200569-01
   build date : Wed Jun 22 08:09:45 2005

*** System SW ***
   version: - unknown -
   part number: - unknown -
   build date : - unknown -
   HW : - unknown -
```

Figure 8-20 Information available on the About tab

2.) Record software and hardware versions in Table 8-8 on page 8-23.

Table 8-8 Record Software versions - Software Version v7.x/v6.x/v5.x/v4.x

DESCRIPTION	RECORD VERSIONS
APPLICATION SW	
SYSTEM SW	
PROCESSOR (BEP) MODEL	

8-7-12 Software Loading - Software Version v7.x/v6.x/v5.x/v4.x

8-7-12-1 Overview

This software loading procedure covers:

- Re-installation of BT’08 software (System Software v3.0.x and Application Software v7.x) on a Vivid 7 unit with BEP4.3
- Re-installation of BT’08 software (System Software v2.1.1 and Application Software v7.x) on a Vivid 7 unit with BEP3.x or BEP4.2
- Re-installation of BT’06 software (System Software v2.x.x and Application Software v6.x) on a Vivid 7 unit.
- Re-installation of BT’05 software (System Software v2.x.x and Application Software v5.x) on a Vivid 7 unit.
- Re-installation of BT’04 software (System Software v2.x.x and Application Software v4.x) on a Vivid 7 unit.

Refer to Table 8-8 "Record Software versions - Software Version v7.x/v6.x/v5.x/v4.x" on page 8-23 where you recorded the unit’s software versions.

The software for Vivid 7 is divided on two CDs:

- one CD with the System Software
- one CD with the Application Software

For a software CD overview, see 8-7-4 "Tools Provided With Unit or After an Upgrade" on page 8-13.

8-7-12-2 Introduction to Software Reloading

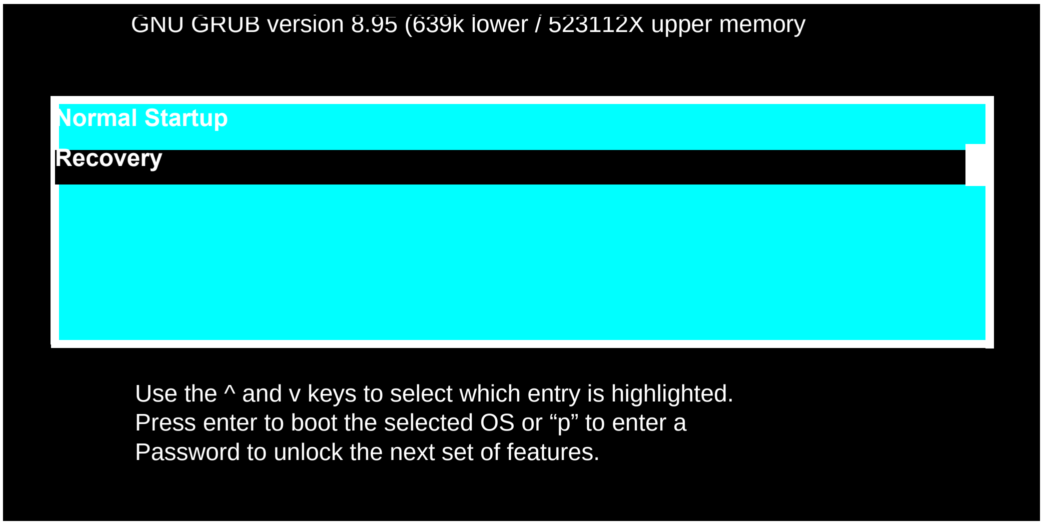
- Starting with System Software version v3.0.0 (and Application Software v7.0.0), the compressed System and Application software has been stored on the Vivid 7’s hard disk drive, making a software reinstallation easier and faster than with previous software.
  - To reinstall the Application Software, go to: 8-7-12-4 "Loading Application Software v7.x on Vivid 7 with BEP4.3" on page 8-27.
  - To reinstall both the System Software and the Application Software, go to: 8-7-12-3 "Loading System Software v3.0.x on Vivid 7 with BEP4.3" on page 8-25.
- For Vivid 7 with System Software version v2.x.x, the software CDs must be used if the software needs to be reinstalled.
  - To reinstall the Application Software, go to: 8-7-12-6 "Application SW Loading - Software Version v7.x/v6.x/v5.x/v4.x" on page 8-32
  - To reinstall both the System Software and the Application Software, go to: 8-7-12-5 "Vivid 7 System Software Loading - Application Software Version v7.x/v6.x/v5.x/v4.x" on page 8-29

8-7-12-3 Loading System Software v3.0.x on Vivid 7 with BEP4.3

NOTE: This procedure describes how to reload software that already has been stored as compressed files on the BEP4.3's hard disk drive. A CD is not used in this procedure.

When using this procedure, you can choose to reload partition C: only, or to erase all partitions. The selection is done later in this procedure.

1.) Reboot the Vivid 7, and press the **ESC**-key each second. The boot sequence will be interrupted and a boot-menu appears on the screen.



```
GNU GRUB version 8.95 (639k lower / 523112X upper memory

Normal Startup
Recovery

Use the ^ and v keys to select which entry is highlighted.
Press enter to boot the selected OS or “p” to enter a
Password to unlock the next set of features.
```

Figure 8-21 Select Recovery

There are two entries in the menu.

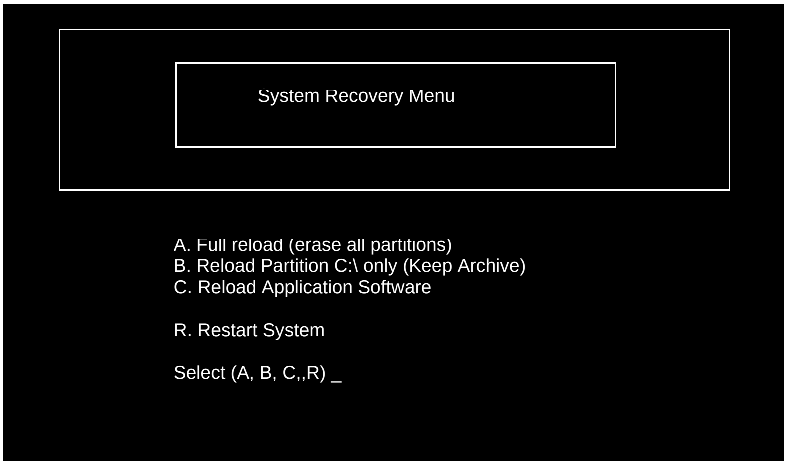
1.) Normal startup
2.) Recovery

Use the arrow keys to select (highlight) your choice.

2.) Select **Recovery.**

3.) Press **Enter** to display the **System Recovery Menu** on the screen, see next page.

8-7-12-3 Loading System Software v3.0.x on Vivid 7 with BEP4.3 (cont'd)



System Recovery Menu

A. Full reload (erase all partitions)
B. Reload Partition C:\ only (Keep Archive)
C. Reload Application Software

R. Restart System

Select (A, B, C,,R) _

Figure 8-22 System Recovery Menu

NOTICE **If you select "A" in the next step, ALL existing software and data will be erased. If backup has not been performed as described earlier in this manual; ALL DATA like Patient Database, System Configuration and User Configurations (Customer Presets) will be lost.**

4.) In this step, you can choose if you want to do a complete Vivid 7 software installation that overwrites all data, or if you only want to update or reinstall the software on the C: partition (C: drive).

Usually it should be OK to select "**B**" to update the C: drive only. This will keep Patient Archive and Presets intact. Continue with either step a (if possible) or step b (if you have to):

*NOTE: If you select "**A**" below, all program data, Patient Archive and Presets will be erased.*

a.) ONLY select "**A**" if a "**B**" update cannot be used: Select **A** to do a complete Vivid 7 software installation.

The reload process start automatically. When done, a message tells you to initiate Application software installation. Continue with step 5.

b.) Select "**B**" to update/re-install the software on the C: partition. (Only data on the C: partition will be erased. This will keep Patient Archive and Presets intact.)

The reload process starts automatically. When done, a message tells you to initiate Application software installation.

5.) Press **Y** to confirm.

The Vivid 7 reboots and the Application software installation starts automatically. When completed, the Vivid 7 reboots normally.

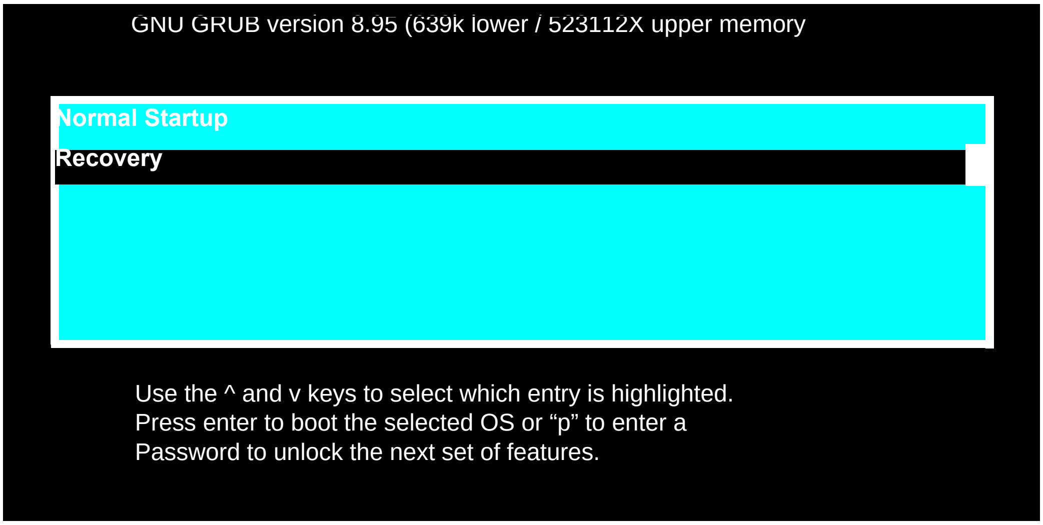
- If you selected **A** above, the User Presets, the System Configurations and the local Patient Archive has been reset to the factory default settings.
- If you selected **B** above, the User Presets, the System Configurations and the local Patient Archive remains as before the software reload.

8-7-12-4 Loading Application Software v7.x on Vivid 7 with BEP4.3

NOTE: *This procedure describes how to reload software that already has been stored as compressed files on the BEP4.3's hard disk drive. A CD is not used in this procedure.*

To reload application software, follow this procedure:

1.) Reboot the Vivid 7, and press the **ESC**-key each second. The boot sequence will be interrupted and a boot-menu appears on the screen.



GNU GRUB version 8.95 (639k lower / 523112X upper memory

Use the ^ and v keys to select which entry is highlighted.
Press enter to boot the selected OS or "p" to enter a
Password to unlock the next set of features.

Figure 8-23 Select Recovery

There are two entries in the menu.

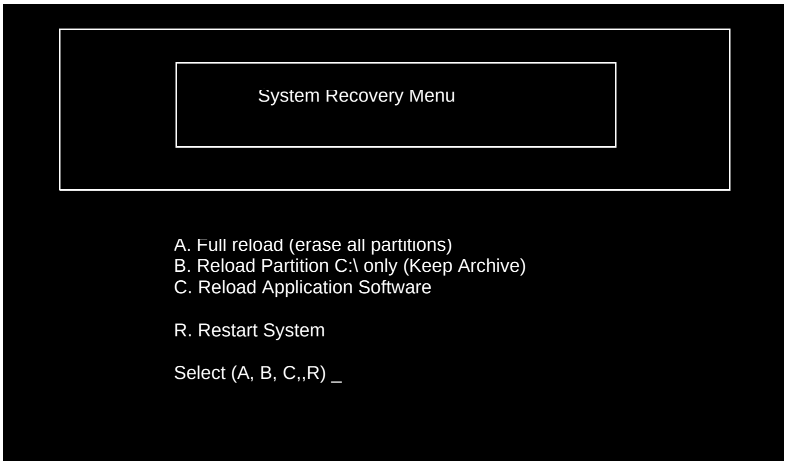
1.) Normal startup
2.) Recovery

Use the arrow keys to select (highlight) your choice.

2.) Select **Recovery.**

3.) Press **Enter** to display the **System Recovery Menu** on the screen, see next page.

8-7-12-4 Loading Application Software v7.x on Vivid 7 with BEP4.3 (cont'd)



```
System Recovery Menu

A. Full reload (erase all partitions)
B. Reload Partition C:\ only (Keep Archive)
C. Reload Application Software

R. Restart System

Select (A, B, C,,R) _
```

Figure 8-24 System Recovery Menu

NOTICE **If you select "A" in the next step, ALL existing software and data will be erased. If backup has not been performed as described earlier in this manual; ALL DATA like Patient Database, System Configuration and User Configurations (Customer Presets) will be lost.**

4.) Select "**C. Reload Application SW**"

5.) Confirm the selection by pressing **Y**.

The system reboots and the Application software installation starts automatically.

When completed, the Vivid 7 reboots and starts up normally. The User Presets, the System Configurations and the local Patient Archive remains as before the software reload.

8-7-12-5 Vivid 7 System Software Loading - Application Software Version v7.x/v6.x/v5.x/v4.x

NOTE: This procedure covers installation of software from CDs.

1.) Insert the applicable *Vivid 7 System Software CD* into the CD/DVD drive.
2.) Power down the System, see 4-2-3 "Power Shut Down" on page 4-7.
3.) Wait until the LCD's on the Operator Panel are switched off and the ON/Standby switch has turned amber.
4.) Power ON the System, see 4-2-3 "Power Shut Down" on page 4-7. The scanner will now boot from the CD you inserted.

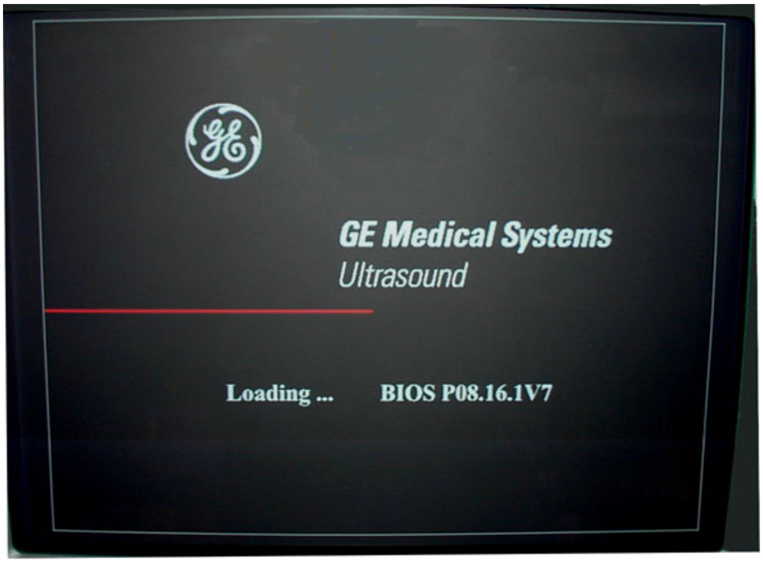


Figure 8-25 BIOS loading (example)

8-7-12-5 Vivid 7 System Software Loading - Application Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

NOTICE **If you select "A" in the next step, ALL existing software and data will be erased. If backup has not been performed as described earlier in this manual; All data like Patient Database, System Configuration and User Configurations (Customer Presets) will be lost.**

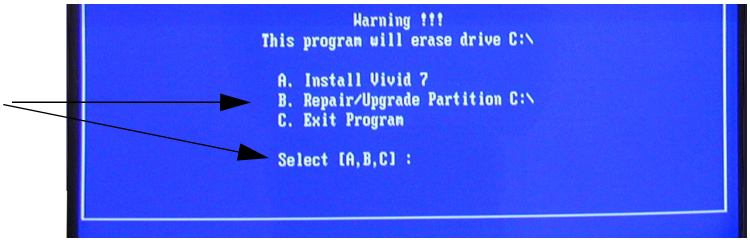
5.) In this step, you can choose if you want to do a complete Vivid 7 installation or if you only want to update or reinstall the software on the C:\ partition (C:\ drive).

Usually it should be OK to select "B" to update the C:\ drive only. This will keep Patient Archive and Presets intact.

a.) Select **B** to update/re-install the software on the C:\ partition. (Only data on the C:\ partition will be erased. This will keep Patient Archive and Presets intact.)

b.) Use "**A**" ONLY if a "**B**" update cannot be used: Select **A** to do a complete Vivid 7 software installation. (All data will be erased.)

c.) Press **C** if you want to Exit.



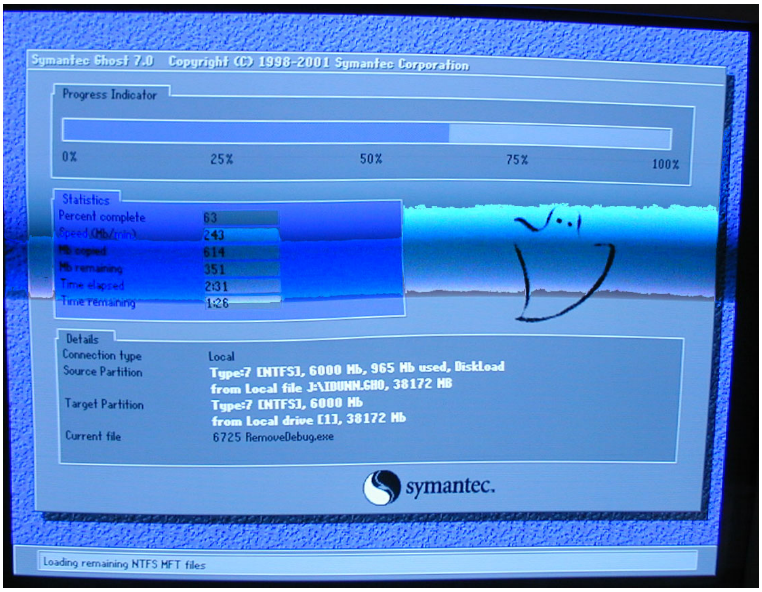
```
Warning !!!
This program will erase drive C:\

A. Install Vivid 7
B. Repair/Upgrade Partition C:\
C. Exit Program

Select [A,B,C] :
```

Press A, B or C to choose the wanted option.

Figure 8-26 Info entry page

8-7-12-5 Vivid 7 System Software Loading - Application Software Version v7.x/v6.x/v5.x/v4.x (cont'd)

6.) The Software loader program starts and the below Time Bar Info Screen appears.


Symantec Ghost 7.0 Copyright (C) 1998-2001 Symantec Corporation
Progress Indicator
0%
25%
50%
75%
100%
Statistics
Details
symantec.

Percent complete 63
Speed (Mb/min) 243
Mb copied 614
Mb remaining 351
Time elapsed 2:31
Time remaining 1:26

Connection type Local
Source Partition Type:7 [NTFS], 6000 Mb, 965 Mb used, DiskLoad
from Local file J:\IDUNN.GHO, 38172 MB
Target Partition Type:7 [NTFS], 6000 Mb
from Local drive [1], 38172 Mb
Current file 6725 RemoveDebug.exe

Loading remaining NTFS MFT files

Figure 8-27 Software Loading Underway
(Picture distorted here due to photo technical limitations, it should look OK on screen)

WARNING ***Do not interrupt the SW loading at any time.***

7.) Wait for the SW Installation to be completed. (Typical installation time: 5 minutes). Status bar on the screen indicates process.

8.) You will now be prompted to remove the first CD and restart the unit when the software Installation is completed. Remove the CD, but **don't restart the System this time**. The next step is to load the application software.

8-7-12-6 Application SW Loading - Software Version v7.x/v6.x/v5.x/v4.x

1.) Insert the applicable CD labelled *Vivid 7 & EchoPAC PC Application SW*.

2.) Keep the ON/Standby switch on the operator panel pressed for a few seconds to power down the scanner. (This is called Forced Shut Down).

3.) Wait until the LCD's on the Operator Panel is switched OFF and the ON/Standby Switch on the Operator Panel has turned yellow.

4.) Power ON the System, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

5.) A dialogue box, called Start Application, will appear, select **Install SW**.

6.) A dialogue box, called Startloader, will appear, select **OK** to continue.

7.) A dialogue box will appear, also named Startloader stating “New System SW installation will start now”, select **OK** to continue.

8.) A Command prompt window will appear, hit any key on the alphanumeric keyboard to continue.

9.) The messages: “Unpacking SW. This will take several minutes.” and “Installing new application software. This will take several minutes” will be displayed on the screen.

10.) Several dialogue boxes will appear on the screen during the SW load.

⚠ **WARNING** ***Do not interrupt the software loading at any time.***

11.) Remove the CD from the CD/DVD drive when prompted.

12.) Press any key to continue.

13.) The Scanner will now power down and reboot.

8-7-13 Verifications - Software Version v7.x/v6.x/v5.x/v4.x

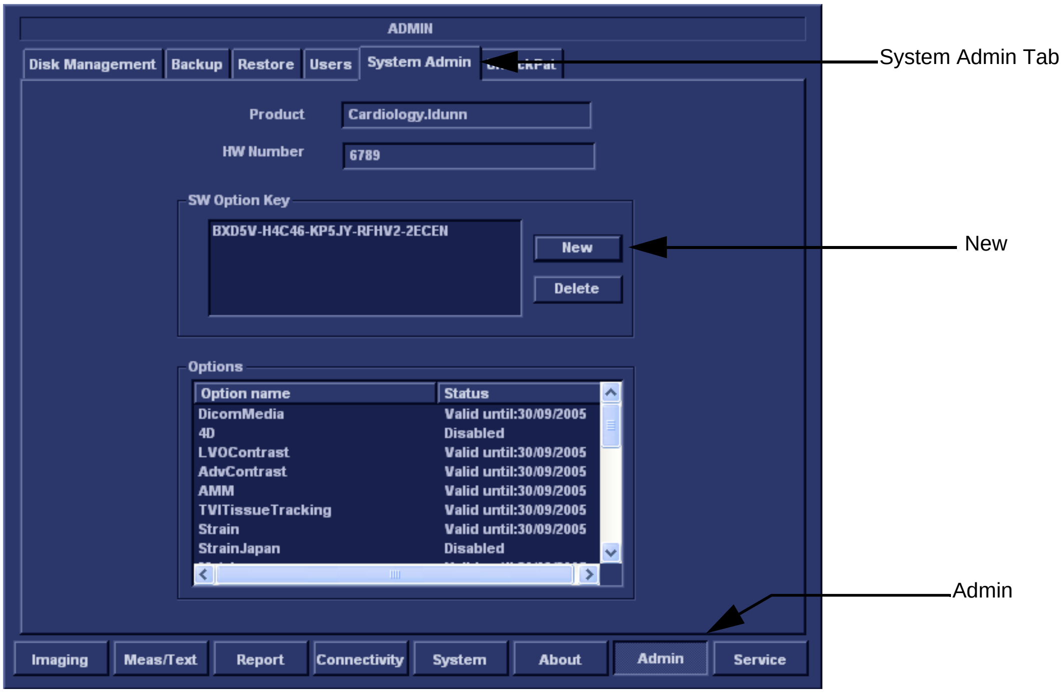
NOTE: *Software Option Strings are software version dependant. If a new software version has been installed, please follow installation instructions for that software. Usually, new software option strings are needed.*

8-7-13-1 Verify SW Option Key Settings

1.) Press **CONFIG** (**F2**) and log on as *ADM*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **Admin** (lower part of window),

3.) Select the **System Admin** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
New
Delete
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Product: Cardiology.ldunn

HW Number: 6789

SW Option Key: BXD5V-H4C46-KP5JY-RFHV2-2ECEN

Options

Option name	Status
DicomMedia	Valid until:30/09/2005
4D	Disabled
LVOContrast	Valid until:30/09/2005
AdvContrast	Valid until:30/09/2005
AMM	Valid until:30/09/2005
TVITissueTracking	Valid until:30/09/2005
Strain	Valid until:30/09/2005
StrainJapan	Disabled

System Admin Tab

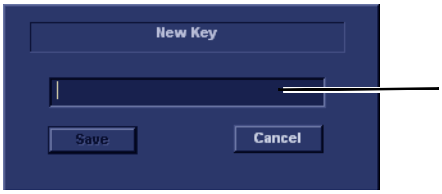
New

Admin

Figure 8-28 System Admin screen

4.) Verify that the SW Options Keys (alphanumeric strings) in the SW Options Key window are the same as recorded in 8-7-8 "Record SW Option Keys - Software Version v7.x/v6.x/v5.x/v4.x" on page 8-20.

5.) Select **New** to open the New Key dialog where you can type any missing Software Option Key(s) (alphanumeric string(s)).


New Key
Save
Cancel

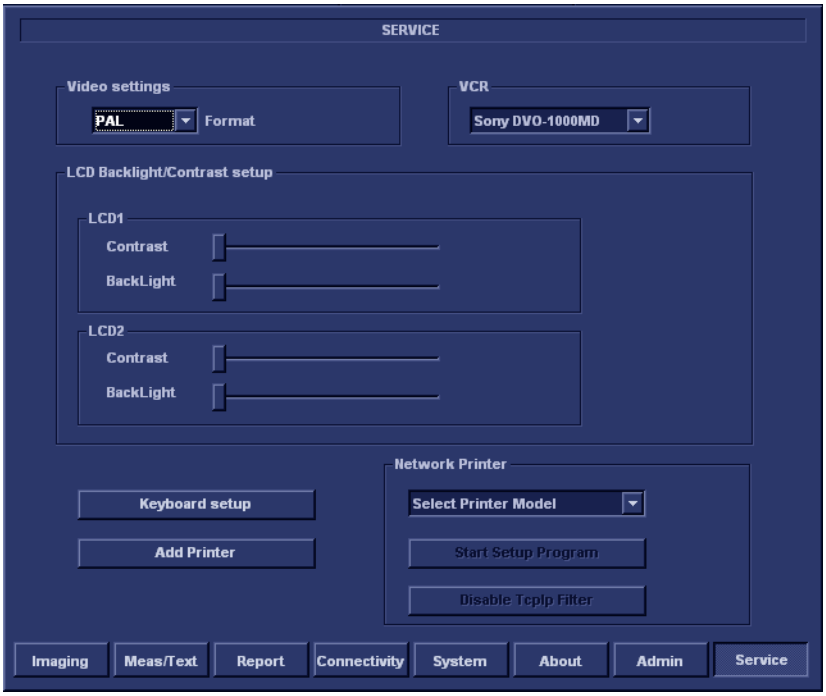
Field for Software Option Key (Serial String)

Figure 8-29 Type Software Option Key

8-7-13-2 Verify Video and VCR Settings - Software Version v7.x/v6.x/v5.x/v4.x

1.) Select **Service** (lower, right corner)

.



Video settings: PAL Format

VCR: Sony DVO-1000MD

SERVICE
Video settings
VCR
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Network Printer
Keyboard setup
Select Printer Model
Add Printer
Start Setup Program
Disable Tcplp Filter
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

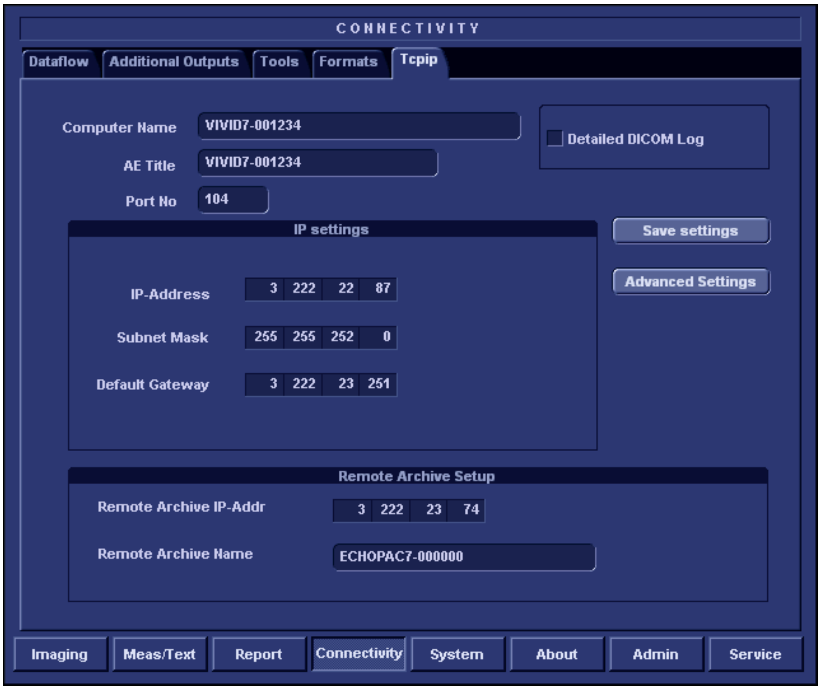
Figure 8-30 Video Settings

6.) From Video Settings pull down menu, verify *Format* as recorded in Table 8-7 on page 8-22. Correct the selection if needed.

7.) From the VCR pull down menu, verify *VCR type* as recorded in Table 8-7 on page 8-22. Correct the selection if needed.

8-7-13-3 Verify TCP/IP Settings - Software Version v7.x/v6.x/v5.x/v4.x

1.) From the top of the Connectivity screen, select the **Tcpip** tab.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
IP settings
Save settings
Advanced Settings
Remote Archive Setup
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

Computer Name VIVID7-001234
AE Title VIVID7-001234
Port No 104
☐ Detailed DICOM Log
IP-Address 3 222 22 87
Subnet Mask 255 255 252 0
Default Gateway 3 222 23 251
Remote Archive IP-Addr 3 222 23 74
Remote Archive Name ECHOPAC7-000000

Figure 8-31 TCP/IP Example Settings

2.) Verify that all settings on the TCPIP tab matches those recorded in Table 8-6 "Record settings from Tcpip screen - software version v7.x/v6.x/v5.x/v4.x" on page 8-21.

3.) Select **Save settings**.

4.) Select **Ok** to continue.

8-7-13-4 DC Offset Calibration

1.) Disconnect all probes.

2.) From the upper section of the window, select **Test**.

3.) Then select **Go to System Test.**

4.) From the Module selection block, select **DC Offs. Cal**.

5.) Reboot the System when the DC Offset Calibration has been completed.

8-7-13-5 Verify System Software Version

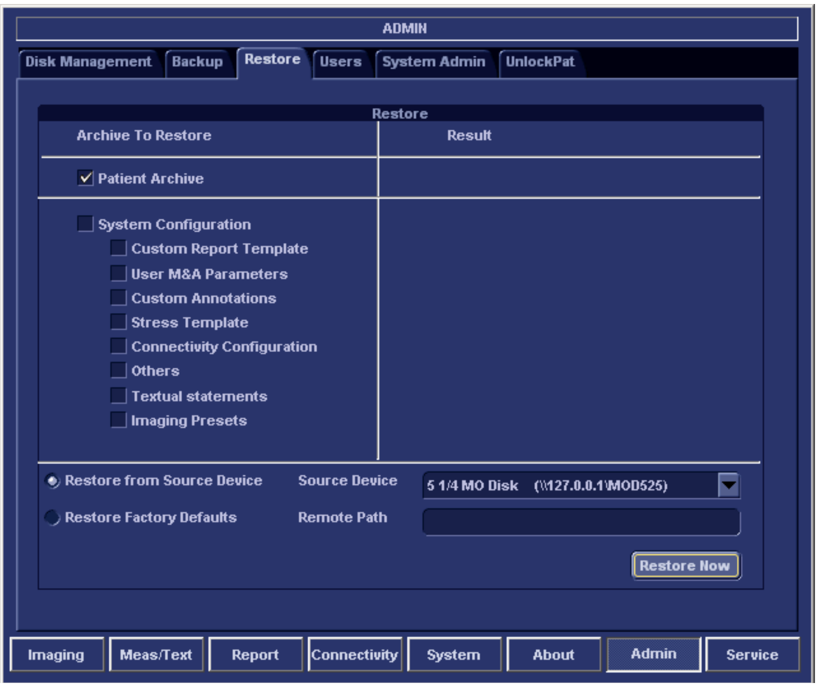
1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **About** tab.

3.) Verify that the software versions are the same as what were recorded in Table 8-8 on page 8-23.

8-7-14 Restore Patient Archive/System Config. - Software v7.x/v6.x/v5.x/v4.x

1.) Press **Config (F2)**.
2.) Select the category **Admin**.
3.) Select the **Restore** tab.


ADMIN
Disk Management
Backup
Restore
Users
System Admin
UnlockPat
Restore
Archive To Restore
Result
Restore Now
Imaging
Meas/Text
Report
Connectivity
System
About
Admin
Service

☑ Patient Archive

☐ System Configuration
  ☐ Custom Report Template
  ☐ User M&A Parameters
  ☐ Custom Annotations
  ☐ Stress Template
  ☐ Connectivity Configuration
  ☐ Others
  ☐ Textual statements
  ☐ Imaging Presets

● Restore from Source Device   Source Device: 5 1/4 MO Disk (\\127.0.0.1\MOD525)
○ Restore Factory Defaults   Remote Path:

Figure 8-32 The Restore tab

4.) In the **Restore** tab select as needed:
- **Patient archive** to restore the patient archive.
- **System configuration** to restore all system settings and user presets. OR
- One or several system configuration items to restore parts of the system settings and user presets, see Figure 8-32 "The Restore tab" on page 8-36.

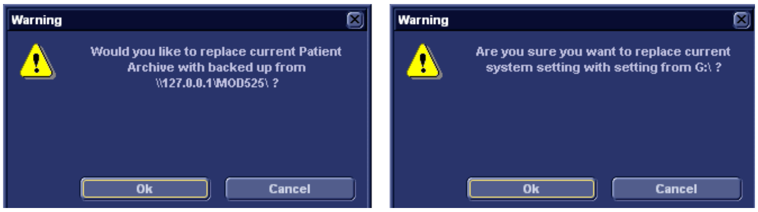
5.) Make sure that **Restore from Source Device** is selected.
6.) Select the appropriate **Source Device**.

CAUTION The Restore procedure will OVERWRITE the existing data on the local harddrive. Make sure to select the correct source device.

7.) If restore is done from a backup on a removable media, insert the media in the drive.

8-7-14 Restore Patient Archive/System Config. - Software v7.x/v6.x/v5.x/v4.x (cont'd)

8.) Select **Restore Now**. Depending on the selection, one or two **Restore confirmation** windows are displayed:

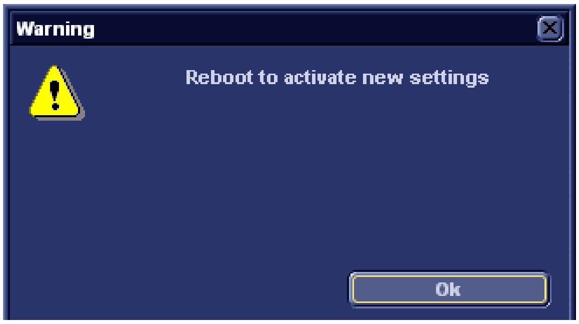


Would you like to replace current Patient Archive with backed up from \\127.0.0.1\MOD525\ ?

Are you sure you want to replace current system setting with setting from G:\ ?

Figure 8-33 The Restore Confirmation window

9.) Ensure that the correct source is selected an select **OK**. The selected items are copied to the systems. If items from the **System Configuration** are restored the system needs to be rebooted. The Reboot system window is displayed.



Reboot to activate new settings

Figure 8-34 The Reboot System window

10.) Select **OK** to reboot the system.

8-7-15 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-8
Software Loading Procedure - Software Version v3.x

NOTICE **Do not use this procedure when *upgrading* a unit's software. Additional software and procedures, not described here, may be needed for such upgrades.**
Use this procedure if you need to reinstall the existing software on a Vivid 7.

8-8-1 Introduction

NOTICE **In order to complete a successful restore of the Patient Database, if needed, the images must be moved to removable media *before* doing backup of Patient Database. If the backup procedure is not completed correctly, the images and database information could be lost.**

This procedure describes how to perform a complete installation of the software on the Vivid 7 hard disk.

8-8-2 Preparations Before Software Re-installation

- Export Patient Images from the internal hard disk to removable removable media .
- Make backup of Customer Presets, Patient Database (Patient Archive, Report Archive, System Configuration and User Defined Configuration) to removable media .
- TCP/IP Addresses, Computer Name and Software Option Password (alphanumeric string) settings must be manually recorded.

8-8-3 Customer Provided Prerequisite

- Formatted and labelled removable media for Images storage
- Formatted and labelled MO Disk for Patient Archive and User Defined Settings.

8-8-4 Tools Provided With Unit or After an Upgrade

Table 8-9 CDs with BT'03 Software, SW. v3.x

ITEM	TITLE	PART NUMBER	DESCRIPTION
1	V7 SYSTEM SW CD, BEP1	FC200563 or FC200165	FC200563_02 is system software version 1.5.1 (for BEP1) FC200165_05 is system software version 1.3.3 (for BEP1)
	V7 SYSTEM SW CD, BEP2	FC200564 or FC200265	FC200564_02 is system software version 1.5.1 (for BEP2) FC200265_04 is system software version 1.3.3 (for BEP2)
	V7 SYSTEM SW CD, BEP2.2	FC200564 or FC200445	USED FOR BEPs in Vivid 7 with RFI FC200445_01 is system software version 1.4.0 (for BEP2.2) FC200564_02 is system software version 1.5.1 (for BEP2.2)
	V7 SYSTEM SW CD, BEP4 as BEP2 and BEP2.2 replacements	FC200825	USED for BEP4 as BEP2 and BEP2.2 replacements FC200824_01 is system software version 1.5.x
2	VIVID 7 & ECHOPAC PC APPL. SW	FC200567 or FC200360	APPLICATION SOFTWARE, COMMON TO Vivid 7 AND ECHOPAC PC FC200567_04 IS APPLICATION SOFTWARE VERSION v3.3.3 FC200360_07 IS APPLICATION SOFTWARE VERSION v3.1.5
	VIVID 7 RFI APPL. SW	FC200455	APPLICATION SOFTWARE, FOR Vivid 7 with RFI FC200455_04 IS APPLICATION SOFTWARE VERSION v3.2.6

8-8-5 Preparations

1.) Switch ON the Mains Power Circuit Breaker and power up the unit, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

2.) Store images to removable media , see 8-8-6 "Backup - Software Version v3.x" on page 8-40.

8-8-6 Backup - Software Version v3.x

The Backup function enables the user to:

- Make backup of the patient archive (patient data and reports).
- Move images from the local hard drive to MO disks.
- Make backup of the system configuration.

8-8-6-1 Move Images From the Local Hard Drive to MO disks.

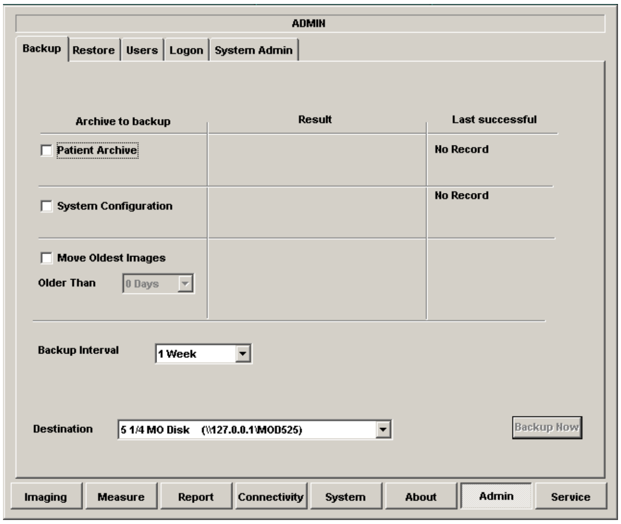
The *Move Images* function is used to move archived images from one volume/media to another and the deletion of the moved images from the original volume. The pointers to the database are restored in the new volume/media.

NOTE: This function copies image data only, no database information is copied.

⚠ **CAUTION Use blank dedicated MO disks when doing backup. The backup will OVERWRITE the existing data on the MO disk.**

NOTE: When moving images, be sure to have enough formatted MO disks available.

1.) Format the MO disks you're going to use for the backup, see 4-2-7 "Formatting Removable Media - Software Version v3.x and above" on page 4-17.
2.) Insert a dedicated and formatted MO disk into the MO drive.
3.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.
4.) Select the Admin setup category.



Archive to backup	Result	Last successful
☐ Patient Archive		No Record
☐ System Configuration		No Record
☐ Move Oldest Images Older Than 0 Days		

Backup Interval 1 Week

Destination 5 1/4 MO Disk (\\127.0.0.1\MOD525)

Figure 8-35 The Admin screen

5.) Select *Move oldest images* to move images from the local hard drive onto MO disks.
6.) Select the MO disk as destination.

8-8-6-1 Move Images From the Local Hard Drive to MO disks. (cont'd)

7.) Press Backup Now.
   - The system is checking that the MO disk is inserted. If not, a dialogue window is displayed prompting the user to insert a MO disk. Select OK to resume backup.
   - The system is checking that the MO disk is formatted. If not, a dialogue window is displayed prompting the user to format the disk.
   - The system is checking the available space on MO disk for the patient archive. If there is not sufficient free space a dialogue window is displayed. Select OK, the media is ejected and insert a new formatted MO disk.

A progress dialogue is displayed showing the current operation being performed.

If the amount of data exceeds the capacity of the MO disk, the user is prompted to insert a new (formatted) MO disk. At the end of the process, a status for each item is displayed in the Result column.

If errors occur during backup, a list of the patient records/ examinations that could not be backed up is displayed.

8-8-6-2 Backup of Patient Archive and System Configurations to MO Disks

The *backup* function is used to make a backup of the Patient Archive and the System Configurations.

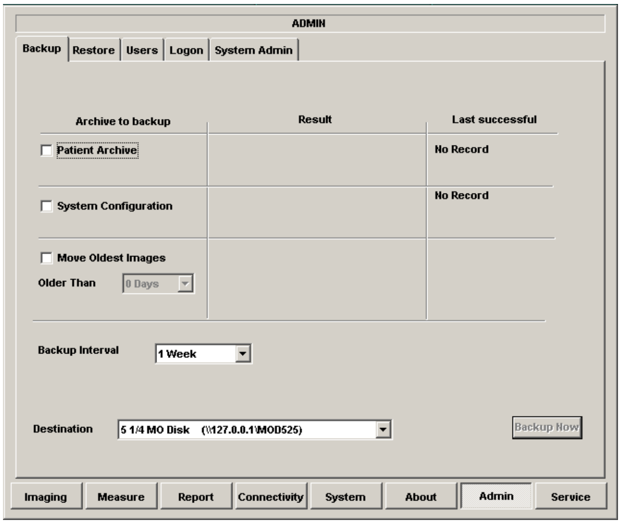
CAUTION **Use a blank dedicated MO disk when doing backup. The backup will OVERWRITE the existing data on the MO disk.**

1.) Format the MO disks you're going to use for the backup, see 4-2-7 "Formatting Removable Media - Software Version v3.x and above" on page 4-17.

2.) Insert the dedicated and formatted MO disk into the MO drive.

3.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

4.) Select the Admin screen.



Archive to backup	Result	Last successful
☐ Patient Archive		No Record
☐ System Configuration		No Record
☐ Move Oldest Images Older Than 0 Days		

Backup Interval 1 Week

Destination 5 1/4 MO Disk (\\127.0.0.1\MOD525)

Figure 8-36 The Admin screen

5.) Select *Patient Archive* and *System Configurations*.

6.) Select the MO disk as destination.

8-8-6-2 Backup of Patient Archive and System Configurations to MO Disks (cont'd)

7.) Select *Backup Now*.

   a.) The system will first check if the MO disk is inserted. If not, a dialogue window is displayed prompting you to insert an MO disk. Select **OK** to resume backup.

   b.) The system will then check if the MO disk is formatted. If not, a dialogue window is displayed prompting you to format the disk.

A progress dialogue is displayed showing the current operation being performed.

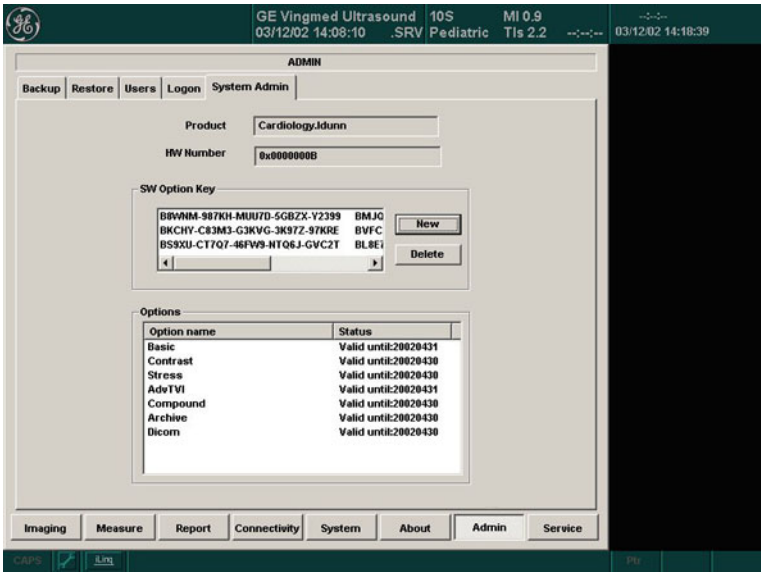
If the amount of data exceeds the capacity of the MO disk, the user is prompted to insert a new (formatted) MO disk. At the end of the process, a status for each item is displayed in the Result column.

If errors occur during backup, a list of the patient records/ examinations that could not be backed up is displayed.

8-8-7 Record SW Option Keys - Software v3.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) From the **Admin** tab, select **SYSTEM ADMIN**.


GE Vingmed Ultrasound
03/12/02 14:08:10
.SRV
10S
Pediatric
MI 0.9
TIs 2.2
03/12/02 14:18:39
ADMIN
Backup
Restore
Users
Logon
System Admin
New
Delete
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Product: Cardiology.Idunn

HW Number: 0x0000000B

SW Option Key

B8WNM-987KH-MUU7D-5GBZX-Y2399 BMJQ
BKCHY-C83M3-G3KVG-3K97Z-97KRE BVFC
BS9XU-CT7Q7-46FW9-NTQ6J-GVC2T BL8E

Options

Option name	Status
Basic	Valid until:20020431
Contrast	Valid until:20020430
Stress	Valid until:20020430
AdvTVI	Valid until:20020431
Compound	Valid until:20020430
Archive	Valid until:20020430
Dicom	Valid until:20020430

Figure 8-37 System Admin

3.) Record SW Options Keys from SW Options Key window.

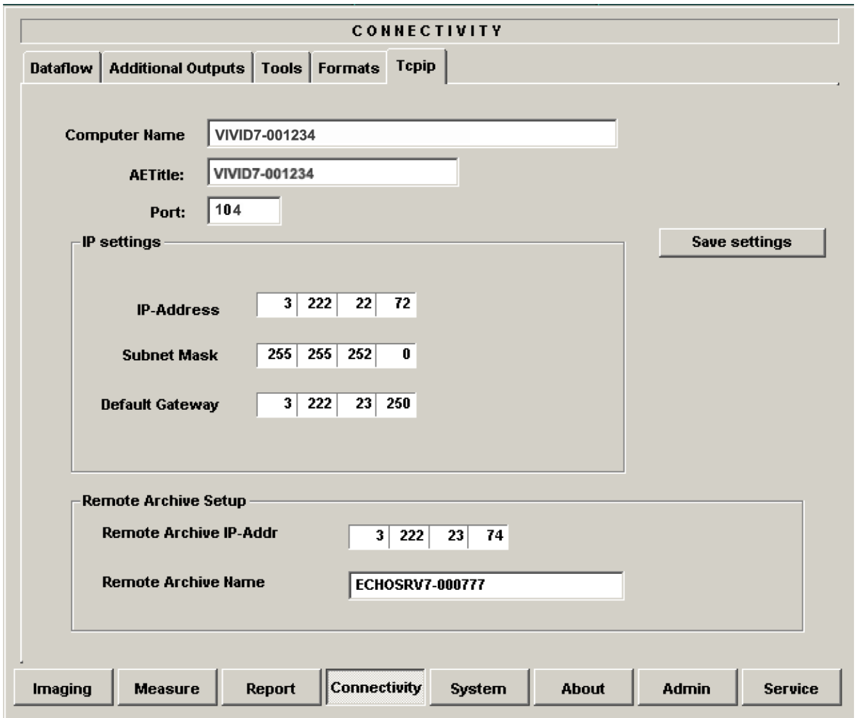
WARNING ***Make sure that the SW Option Keys (passwords) have been recorded correctly. If the key is incorrect, you will not be able to log on after the SW installation has been completed. The password is case sensitive. Hyphens must also be recorded. There may be more than one password.***

Table 8-10 SW Options Keys

SW OPTIONS KEYS

8-8-8 Record TCP/IP Settings - Software Version v3.x

1.) Select **Connectivity**.
2.) Select the **Tcpip** tab.
3.) Record all settings in Table 8-11 "Record settings from Tcpip screen (v3.x)" on page 8-44.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name VIVID7-001234
AETitle: VIVID7-001234
Port: 104

IP settings
IP-Address 3 222 22 72
Subnet Mask 255 255 252 0
Default Gateway 3 222 23 250

Remote Archive Setup
Remote Archive IP-Addr 3 222 23 74
Remote Archive Name ECHOSRV7-000777

Figure 8-38 TCP/IP Example Settings

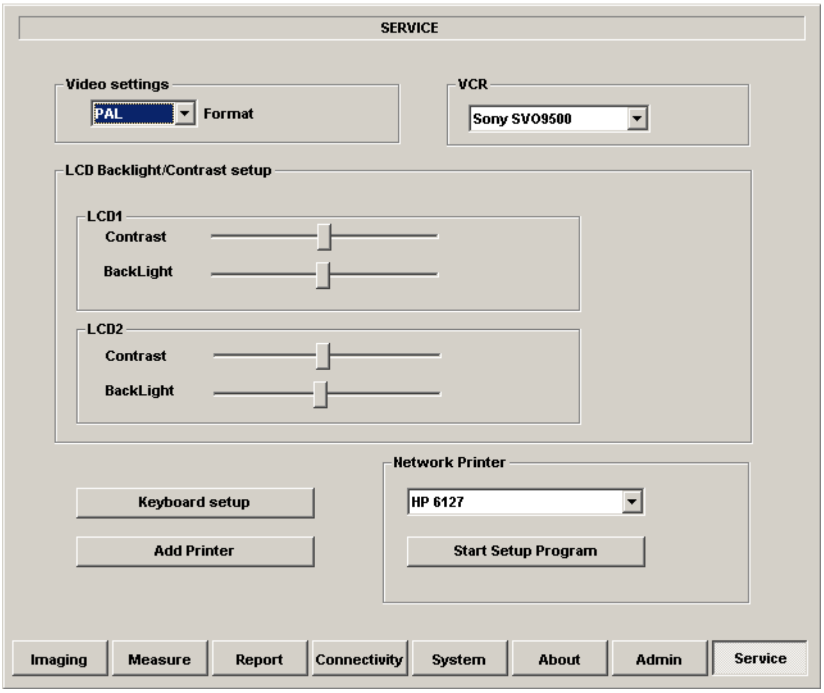
Table 8-11 Record settings from Tcpip screen (v3.x)

PARAMETER	VALUE
Computer Name	VIVID7-00 _ _ _ _
AE Title	VIVID7-00 _ _ _ _
IP Settings	
IP Address	_ _ _ . _ _ _ . _ _ _
Subnet mask	_ _ _ . _ _ _ . _ _ _
Default Gateway	_ _ _ . _ _ _ . _ _ _
Remote Archive Setup	
Remote Archive IP-Addr	_ _ _ . _ _ _ . _ _ _
Remote Archive Name	

8-8-9 Record Service Settings - Software Version v3.x

1.) Select **Service**.

.



SERVICE

Video settings
PAL Format

VCR
Sony SVO9500

LCD Backlight/Contrast setup

Network Printer
HP 6127

LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Keyboard setup
Add Printer
Start Setup Program
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Figure 8-39 Service Settings

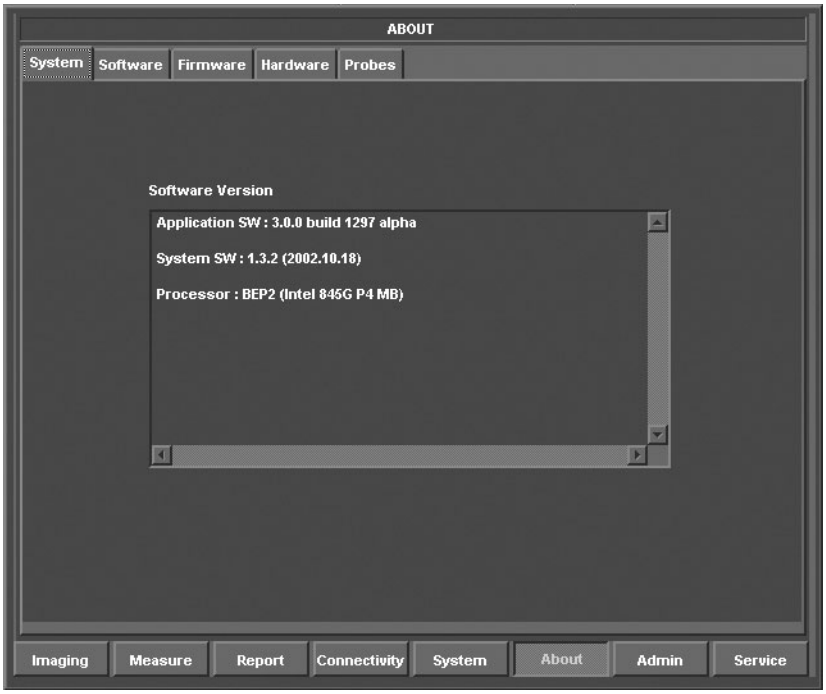
2.) Record Video Setting Format and VCR Type in Table 8-12 on page 8-45.

Table 8-12 Video Setting and VCR type

VIDEO SETTING FORMAT	VCR TYPE
___ PAL ___NTSC	

8-8-10 Information on the About tab - Software Version v3.x

1.) Select the **About** tab.


ABOUT
System
Software
Firmware
Hardware
Probes
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Software Version

Application SW : 3.0.0 build 1297 alpha

System SW : 1.3.2 (2002.10.18)

Processor : BEP2 (Intel 845G P4 MB)

Figure 8-40 Information available on the About tab

2.) Record software and hardvare versions in Table 8-13 on page 8-46.

Table 8-13 Record Software and Hardware versions (v3.x)

DESCRIPTION	RECORD VERSION
APPLICATION SW	
SYSTEM SW	
Processor (BEP)	

8-8-11 Software Loading - Software Version v3.x

8-8-11-1 Overview

This software loading procedure covers:

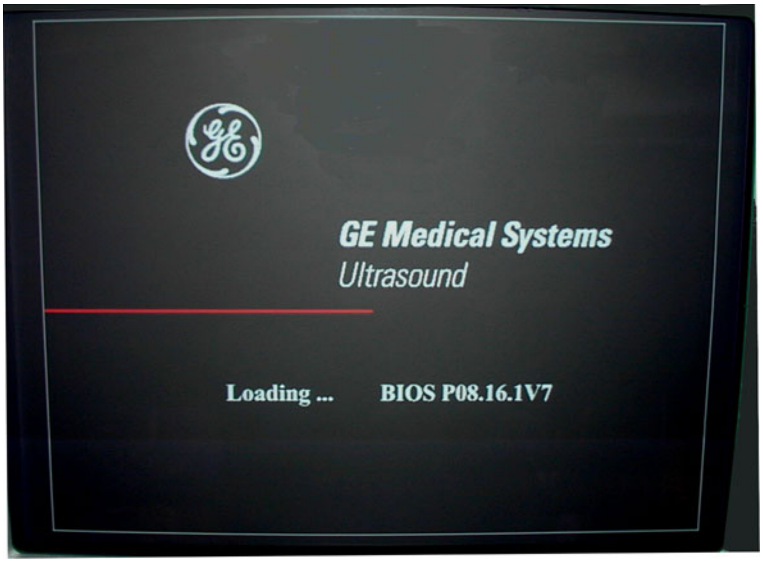
- Installation of BT’03 software (software version v3.x) on Vivid 7 units.

Refer to Table 8-13 on page 8-46 where you recorded the unit’s software versions.

The software for Vivid 7 is divided on two CDs, one CD with the System Software and one with the Application Software.

8-8-11-2 Vivid 7 System SW Loading - Software Version v3.x

1.) Insert the applicable *Vivid 7 System Software CD* into the CD drive.
2.) Power down the System, see 4-2-3 "Power Shut Down" on page 4-7.
3.) Wait until the LCD’s on the Operator Panel are switched off and the ON/Standby switch has turned yellow.
4.) Power ON the System, see 4-2-3 "Power Shut Down" on page 4-7. The scanner will now boot from the CD you inserted.



Loading ... BIOS P08.16.1V7

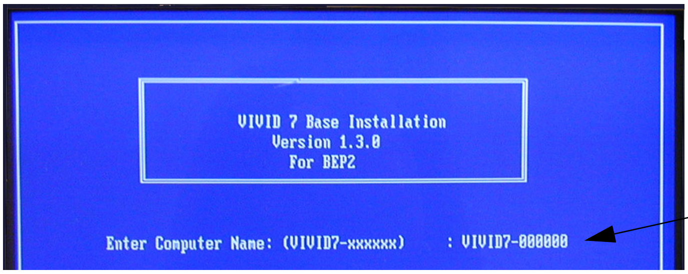
Figure 8-41 BIOS loading example

8-8-11-2 Vivid 7 System SW Loading - Software Version v3.x (cont'd)

5.) When requested, enter the missing part of the Computer Name (the unit's serial number) as you recorded it in Table 8-6 "Record settings from Tcpip screen - software version v7.x/v6.x/v5.x/v4.x" on page 8-21.

Example: VIVID7-001890

Always enter two zeros before you enter the serial number. This means that when you have a serial number which is 1890 you enter 001890. When the serial number is 1123 you enter 001123.



```
VIVID 7 Base Installation
     Version 1.3.0
       For BEP2

Enter Computer Name: (VIVID7-xxxxxx)     : VIVID7-000000
```

Enter the Serial Number here

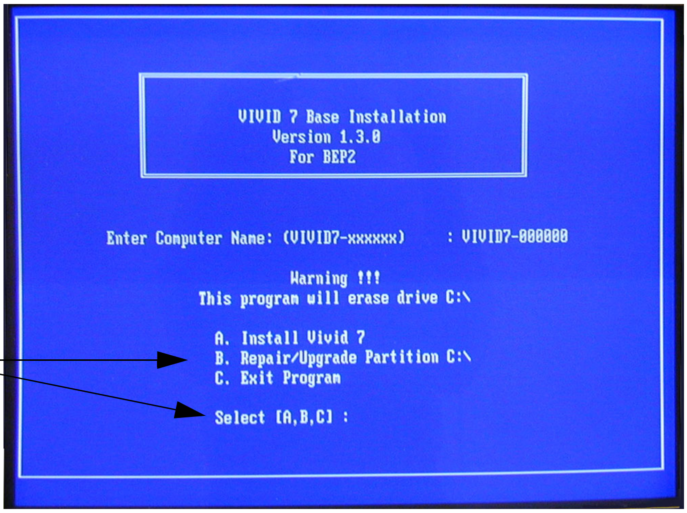
Figure 8-42 Serial Number entry example

NOTICE If you select "**A"** in the next step, ALL existing software and data will be erased. If backup has not been performed as described earlier in this manual; All data like Patient Database, System Configuration and User Configurations (customer presets) will be lost.

6.) In this step, you can choose if you want to do a complete Vivid 7 installation and deleta all data or if you only want to update or reinstall the software on the C:\ partition (C:\ drive).

Usually it should be OK to select "**B"** to update the C-drive only. This will keep Patient Archive and Presets intact.

- a.) Select **B** to update/re-install the software on the C:\ partition. (Only data on the C partition will be erased. This will keep Patient Archive and Presets intact.
- b.) Use "**A**" ONLY if a "**B**" update cannot be used: Select **A** to do a complete Vivid 7 software installation. (All data will be erased.)
- c.) Press **C** if you want to Exit.



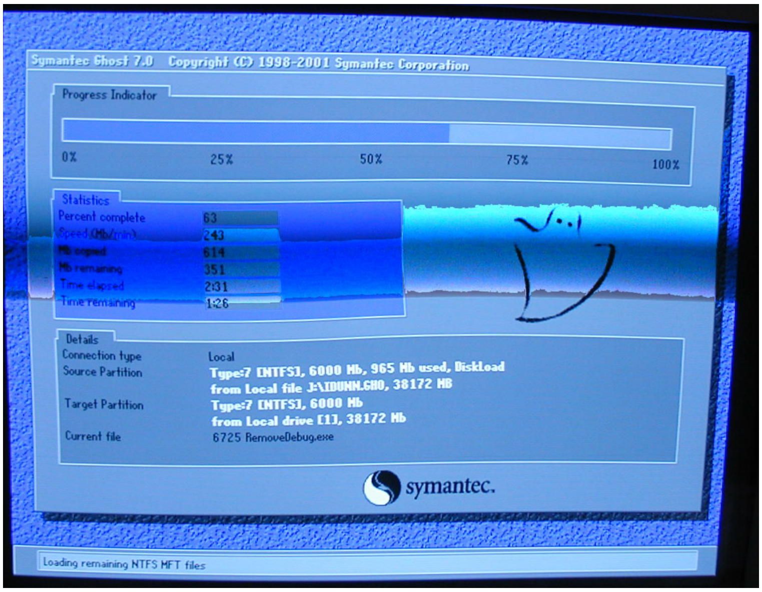
```
VIVID 7 Base Installation
     Version 1.3.0
       For BEP2

Enter Computer Name: (VIVID7-xxxxxx)     : VIVID7-000000

               Warning !!!
     This program will erase drive C:\

       A. Install Vivid 7
       B. Repair/Upgrade Partition C:\
       C. Exit Program

       Select [A,B,C] :
```

Press A, B or C to choose the wanted option.

Figure 8-43 Info entry page

8-8-11-2 Vivid 7 System SW Loading - Software Version v3.x (cont'd)

7.) The Software loader program starts and the below Time Bar Info Screen appears.



```
Symantec Ghost 7.0   Copyright (C) 1998-2001 Symantec Corporation

Progress Indicator
0%          25%          50%          75%          100%

Statistics
Percent complete     63
Speed (Mb/min)       243
Mb copied            614
Mb remaining         351
Time elapsed         2:31
Time remaining       1:26

Details
Connection type      Local
Source Partition     Type:7 [NTFS], 6000 Mb, 965 Mb used, DiskLoad
                     from Local file J:\IDUNN.GHO, 38172 MB
Target Partition     Type:7 [NTFS], 6000 Mb
                     from Local drive [1], 38172 Mb
Current file         6725 RemoveDebug.exe

Loading remaining NTFS MFT files
```

Figure 8-44 Software Loading Underway
(Picture distorted here due to photo technical limitations, it should look OK on screen)

⚠ **WARNING** ***Do not interrupt the SW loading at any time.***

8.) Wait for the SW Installation to be completed. (Typical installation time: 5 minutes). Status bar on the screen indicates process.

9.) You will now be prompted to remove the first CD and restart the unit when the SW Installation is completed. Remove the CD, but **<u>don't restart the System this time</u>**. The next step is to load the application software.

8-8-11-3 Application SW Installation - Software Version v3.x

1.) Insert the applicable CD labelled *Vivid7 & EchoPAC PC Application SW*, see Table 8-9 "CDs with BT'03 Software, SW. v3.x" on page 8-39.

2.) Keep the ON/Standby switch on the operator panel pressed for a few seconds to power down the scanner. (This is called Forced Shut Down).

3.) Wait until the LCD's on the Operator Panel is switched OFF and the ON/Standby Switch on the Operator Panel has turned yellow.

4.) Power ON the System, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

5.) A dialogue box, called Start Application, will appear, select **Install SW**.

6.) A dialogue box, called Startloader, will appear, select **OK** to continue.

7.) A dialogue box will appear, also named Startloader stating "New System SW installation will start now", select **OK** to continue.

8.) A Command prompt window will appear, hit any key on the alphanumeric keyboard to continue.

9.) A message in the Command prompt window may prompt you that copying application software takes three minutes. This may take as much as five minutes.

10.) Several dialogue boxes will appear on the screen during the SW load.

⚠ **WARNING** ***Do not interrupt the SW loading at any time.***

11.) Remove the CD from the CD drive when prompted.

12.) Press any key to continue.

13.) The Scanner will now power down and reboot.

8-8-12 Verifications - Software Version v3.x

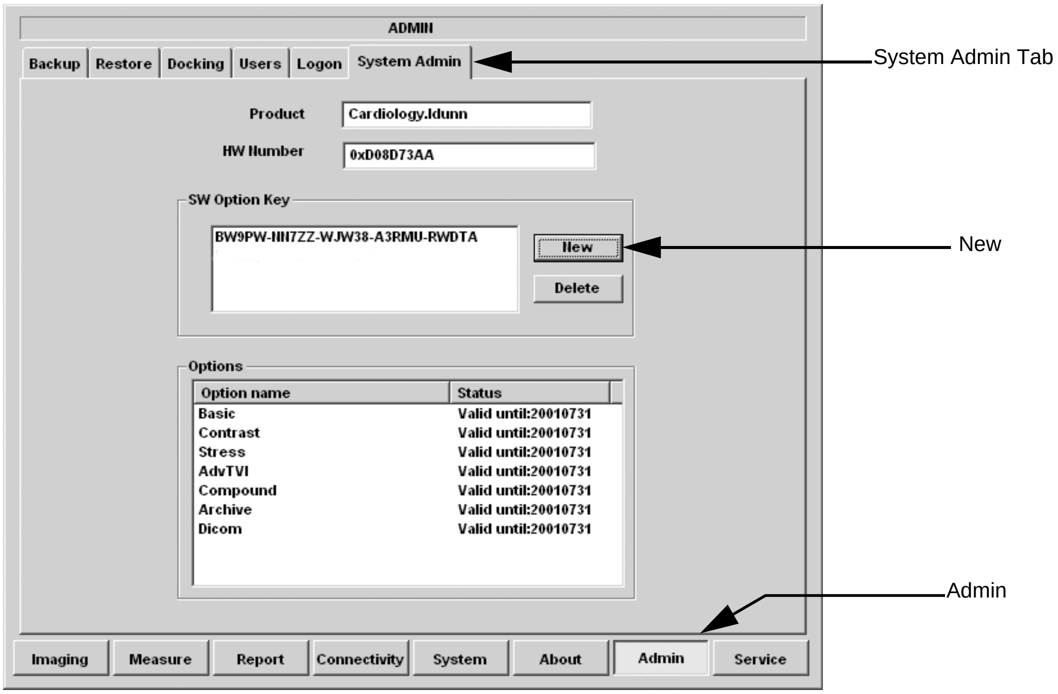
NOTE: *Software Option Strings are software version dependant. If a new software version has been installed, please follow installation instructions for that software. Usually, new software option strings are needed.*

8-8-12-1 Verify SW Option Key Settings - Software Version v3.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.

2.) Select **Admin** (lower part of window).

3.) Select the **SYSTEM ADMIN** tab.


ADMIN
Backup
Restore
Docking
Users
Logon
System Admin
System Admin Tab
SW Option Key
New
Delete
Options
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Product: Cardiology.ldunn

HW Number: 0xD08D73AA

SW Option Key: BW9PW-NN7ZZ-WJW38-A3RMU-RWDTA

Option name	Status
Basic	Valid until:20010731
Contrast	Valid until:20010731
Stress	Valid until:20010731
AdvTVI	Valid until:20010731
Compound	Valid until:20010731
Archive	Valid until:20010731
Dicom	Valid until:20010731

Figure 8-45 System Admin screen

4.) Verify that the SW Options Keys (alphanumeric strings) in the SW Options Key window are the same as recorded in 8-8-7 "Record SW Option Keys - Software v3.x" on page 8-43.

5.) Select **New** to open the New Key dialog where you can type any missing Software Option Key(s) (alphanumeric string(s)).

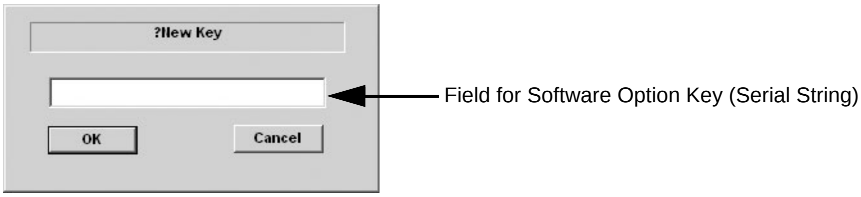
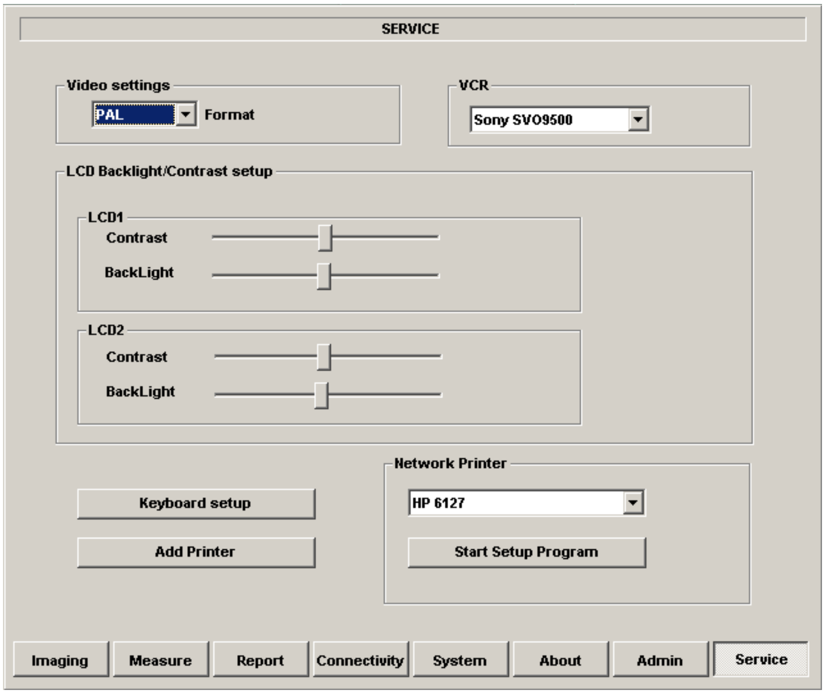

?New Key
OK
Cancel
Field for Software Option Key (Serial String)

Figure 8-46 Type Software Option Key

8-8-12-2 Verify Video and VCR Settings - Software Version v3.x

1.) Select **Service** (lower, right corner)

.



SERVICE
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Keyboard setup
Add Printer
Start Setup Program
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Video settings: PAL Format

VCR: Sony SVO9500

Network Printer: HP 6127

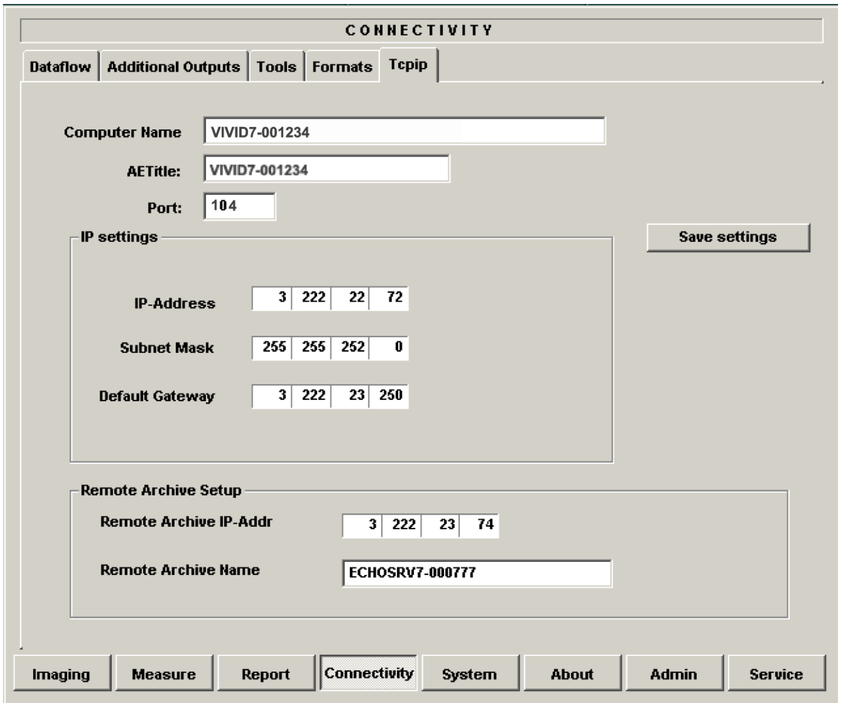
Figure 8-47 Video Settings

6.) From Video Settings pull down menu, verify *Format* as recorded in Table 8-12 on page 8-45. Correct the selection if needed.

7.) From the VCR pull down menu, verify *VCR type* as recorded in Table 8-12 on page 8-45. Correct the selection if needed.

8-8-12-3 Verify TCP/IP Settings - Software Version v3.x

1.) From the top of the connectivity tab, select the **Tcpip** tab.


CONNECTIVITY
Dataflow
Additional Outputs
Tools
Formats
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Computer Name VIVID7-001234
AETitle: VIVID7-001234
Port: 104

IP settings
IP-Address 3 222 22 72
Subnet Mask 255 255 252 0
Default Gateway 3 222 23 250

Remote Archive Setup
Remote Archive IP-Addr 3 222 23 74
Remote Archive Name ECHOSRV7-000777

Figure 8-48 TCP/IP Example Settings

2.) Verify that all settings on the TCPIP tab matches those recorded in Table 8-11 "Record settings from Tcpip screen (v3.x)" on page 8-44.

3.) Select **Save settings**.

4.) Select **Ok** to continue.

8-8-12-4 DC Offset Calibration

1.) Disconnect all probes.

2.) From the upper section of the window, select **Test**.

3.) Then select **Go to System Test.**

4.) From the Module selection block, select **DC Offs. Cal**.

5.) Reboot the System when the DC Offset Calibration has been completed.

8-8-12-5 Verify System Software Version

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **about** tab.

3.) Verify that the SW versions are the same as what were recorded in Table 8-13 "Record Software and Hardware versions (v3.x)" on page 8-46.

8-8-13 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-9
Software Loading Procedure - Software Version v2.x

NOTICE Do not use this procedure when *upgrading* a unit's software. Additional software and procedures, not described here, may be needed for such upgrades.
Use this procedure if you need to reinstall the existing software on a Vivid 7.

8-9-1 Introduction

NOTICE In order to complete a successful restore of the Patient Database, if needed, the images must be moved to MO disks *before* doing backup of Patient Database. If the backup procedure is not completed correctly, the images and database information could be lost.

This procedure describes how to perform a complete installation of the software on the Vivid 7 hard disk.

8-9-2 Preparations To Be Done Before Software Re-installation

- Export Patient Images from the internal hard disk to removable MO disks.
- Make backup of Customer Presets, Patient Database (Patient Archive, Report Archive, System Configuration and User Defined Configuration) to MO disks.
- TCP/IP Addresses, Computer Name and Software Option Password (alphanumeric string) settings must be manually recorded.

8-9-3 Customer Provided Prerequisite

- Formatted and labelled MO Disks for Images storage
- Formatted and labelled MO Disk for Patient Archive and User Defined Settings.

8-9-4 Tools Provided With Unit or After a Software Upgrade

8-9-4-1 Units with BT'02 Software

NOTE: Units with software version v2.3.0 or below and all version v1.x should be upgraded to software version v2.3.1 as described in FMI 76037.

Table 8-14 CDs with BT'02 Software, Version v2.x

ITEM	TITLE	PART NUMBER	DESCRIPTION
1	V7 SYSTEM SW CD, BEP1	FC200563 or FC200165	FC200563_02 is system software version 1.5.1 (for BEP1) FC200165_05 is system software version 1.3.3 (for BEP1)
	V7 SYSTEM SW CD, BEP2.0	FC200564 or FC200265	FC200564_02 is system software version 1.5.1 (for BEP2) FC200265_04 is system software version 1.3.3 (for BEP2)
	V7 SYSTEM SW CD, BEP4 as BEP2 (and BEP1) replacement	FC200825	USED for BEP4 as BEP2 (and BEP1) replacement FC200824_01 is system software version 1.5.x
2	VIVID 7 & ECHOPAC PC APPL. SW	FC200566	APPLICATION SOFTWARE, COMMON TO Vivid 7 AND ECHOPAC PC FC200566_03 IS APPLICATION SOFTWARE VERSION v2.4.2
	VIVID 7 & ECHOPAC PC APPL. SW	FC200220	Application software, common to Vivid 7 and EchoPAC PC FC200220-14 is application sw. 2.3.5

8-9-5 Preparations

1.) Switch ON the Mains Power Circuit Breaker and power up the unit, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

2.) Continue with 8-9-6 "Prepare MO Disks for Image Storage - Software Version v2.x" on page 8-56.

8-9-6 Prepare MO Disks for Image Storage - Software Version v2.x

NOTE: *When formatting the MO disks, give them logical names and make sure to physically label the disks.*
- A labelling convention should be followed so that each MO disk gets a unique label.
- A maximum numbers of eleven (11) label characters are allowed in the label name.
- Use different labels on the MO disk's A side and B side.

1.) Label the MO Disks sequentially.i.e Image 1A (Side A), Image 1B (side B), Image 2A etc.

2.) If the MO Disks is already formatted and labelled continue with 8-9-7 "Move Images - Software Version v2.x" on page 8-57.

3.) Insert a MO disk, side A, into the empty MO drive.

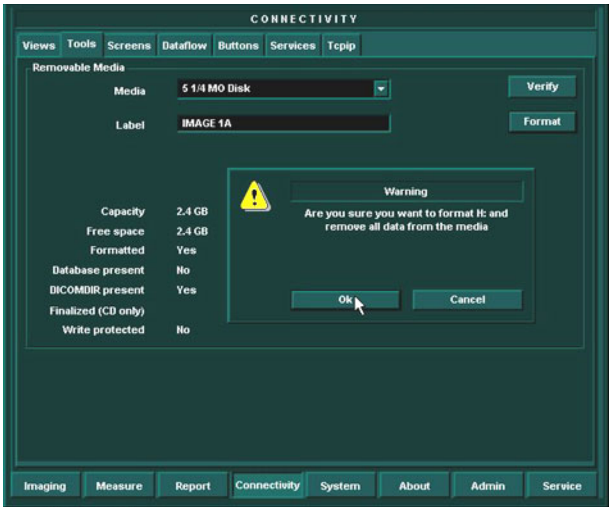
4.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

5.) Select **Connectivity** in the Image and Analysis menu.

6.) Select **Tools** in the Connectivity menu.

7.) In the Label window, type the same name as labelled on the MO disk side A.

8.) Select **Format.**


CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Removable Media
Verify
Format
Warning
Ok
Cancel
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Media: 5 1/4 MO Disk
Label: IMAGE 1A
Capacity: 2.4 GB
Free space: 2.4 GB
Formatted: Yes
Database present: No
DICOMDIR present: Yes
Finalized (CD only)
Write protected: No

Are you sure you want to format H: and remove all data from the media

Figure 8-49 Prepare MO Disk - Image Storage

9.) A warning "Are you sure you want to format H: and remove all data from the media" appears, select **OK.**

10.) Wait until the information dialogue window appears on screen.

11.) Select **OK** to continue.

12.) Verify the disk formatting status has been updated.

13.) Press **ALT-E.**

14.) Select the *5 1/4 MO Disk*, to eject Disk.

15.) Insert the MO disk, side B and repeat step 7 to 14.

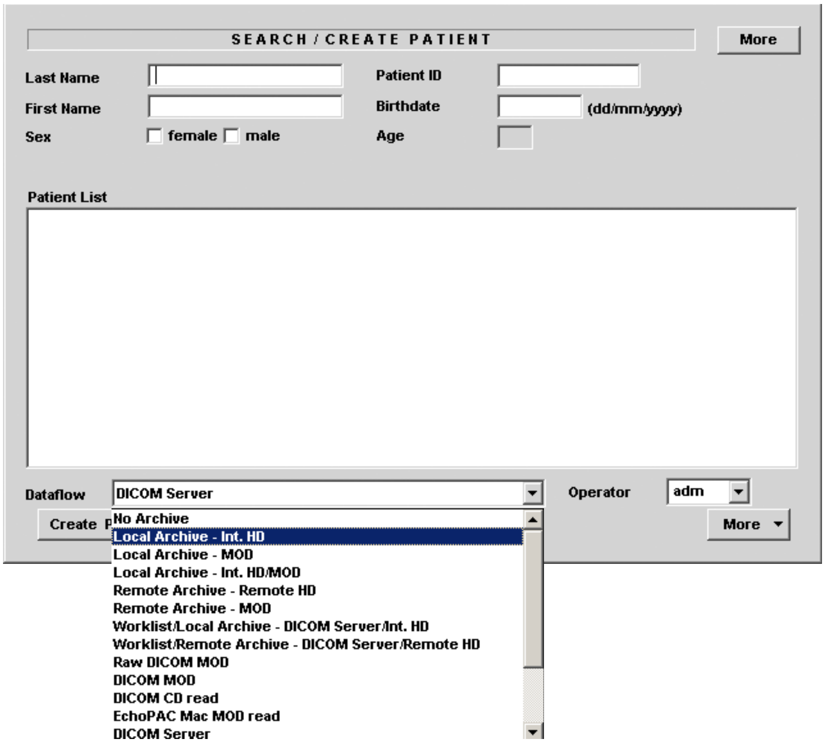
8-9-7 Move Images - Software Version v2.x

The *Move Images* function enables the movement of archived images from one volume/media to another and the deletion of the moved images from the original volume. The pointers to the database are restored in the new volume/media.

NOTE: This function copies image data only, no database information is copied.

Move Images from Local Archive to a Removable Media

1.) Insert a formatted MO Disk in the MO Drive.
2.) Press **ARCHIVE** on the Operator Panel to open the SEARCH / CREATE PATIENT screen.
3.) Select “Local Archive - Int HD” if it isn’t already selected as default.

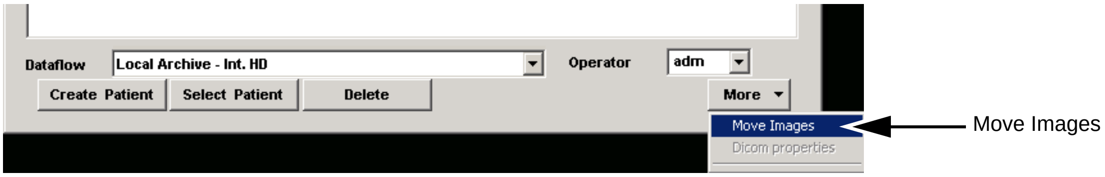

Dataflow: DICOM Server
Operator: adm

SEARCH / CREATE PATIENT
More
Last Name
First Name
Sex
female
male
Patient ID
Birthdate
(dd/mm/yyyy)
Age
Patient List
Create P
More
No Archive
Local Archive - Int. HD
Local Archive - MOD
Local Archive - Int. HD/MOD
Remote Archive - Remote HD
Remote Archive - MOD
Worklist/Local Archive - DICOM Server/Int. HD
Worklist/Remote Archive - DICOM Server/Remote HD
Raw DICOM MOD
DICOM MOD
DICOM CD read
EchoPAC Mac MOD read
DICOM Server

Figure 8-50 Search/Create Patient Window - Select “Local Archive - Int HD”

8-9-7Move Images - Software Version v2.x (cont'd)

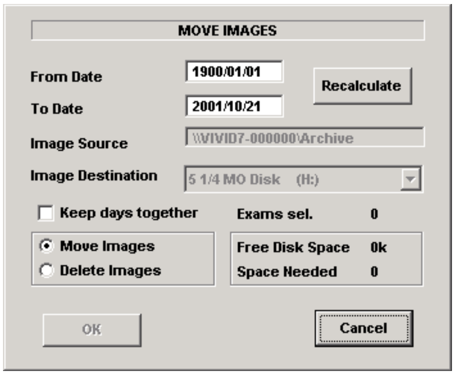
4.) Select *Move Images* from the *More* pull-down menu (Figure 8-51) to display the MOVE IMAGES window (Figure 8-52).



Dataflow: Local Archive - Int. HD

Operator: adm

Figure 8-51 Select Move Images from the More pull-down menu



MOVE IMAGES

From Date: 1900/01/01

To Date: 2001/10/21

Image Source: \\VIVID7-000000\Archive

Image Destination: 5 1/4 MO Disk (H:)

☐ Keep days together

Exams sel. 0

● Move Images

○ Delete Images

Free Disk Space 0k

Space Needed 0

Figure 8-52 The Move Images Window

5.) Adjust **From date** and **To date** to select the images from a defined time period.

6.) Check **Keep days together** if images from examinations performed on the same day are to be kept on the same MO disk.

7.) Press **Recalculate**.
The *Free disk space* and *Needed space* information is updated. Make sure that the space needed does not exceed the space available.

NOTE: If the space needed is bigger than the available space on the destination media, the time period selected must be decreased by selecting an earlier date in the ***To date field****.*
Press ***Recalculate*** *again and ensure that there is enough space.*

8.) Select OK.
A progress indicator is displayed.

9.) After completion, Select OK.

10.) Remove MO-Disk with moved Images from MO-Drive.

11.) In case archive HD exceed MO Disk media capacity;

   a.) Insert a new MO-Disk.

   b.) Repeat step 5 through 11 as needed.

8-9-8 Prepare MO Disk for Patient Archive - Software Version v2.x

NOTE: A separate MO disk is required for backup of Patient Database, System Configuration and User Defined Configurations (customer presets).
This MO disk must be a separate disk with no images stored.

1.) Label the MO Disk “Backup”.

2.) If the MO Disks is already formatted and labelled, move to section 8-9-9 on page 8-60

3.) Insert a MO disk, side A, into the empty MO drive.

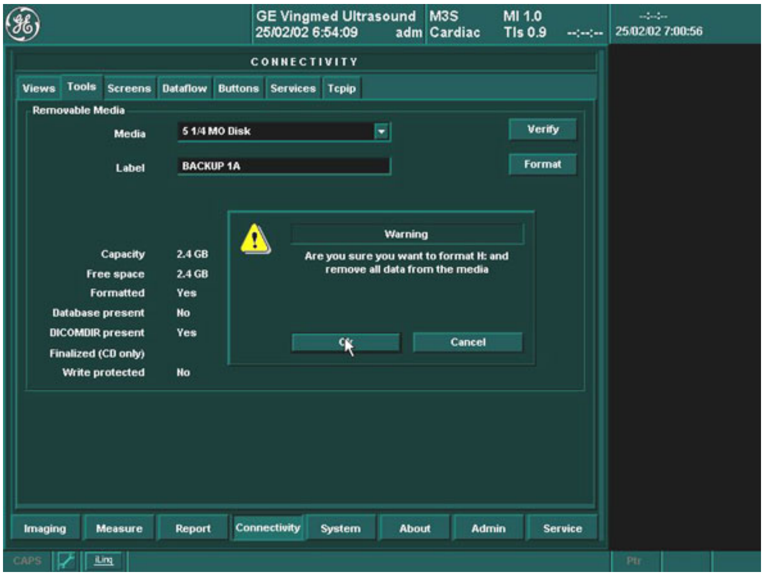
4.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as ‘ADM’" on page 4-12.

5.) Select **Connectivity** in the Image and Analysis menu.

6.) Select **Tools** in the Connectivity menu.

7.) In the Label window, type the same name as labelled on the MO disk side A.

8.) Select **Format**.


GE Vingmed Ultrasound
25/02/02 6:54:09 adm
M3S
Cardiac
MI 1.0
TIs 0.9
--:--:--
--:--:--
25/02/02 7:00:56
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Removable Media
Verify
Format
Warning
Ok
Cancel
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Media: 5 1/4 MO Disk
Label: BACKUP 1A

Capacity 2.4 GB
Free space 2.4 GB
Formatted Yes
Database present No
DICOMDIR present Yes
Finalized (CD only)
Write protected No

Are you sure you want to format H: and remove all data from the media

Figure 8-53 Prepare MO Disk - Patient Archive

9.) A warning “Are you sure you want to format H: and remove all data from the media” appears, select **OK.**

10.) Wait until the information dialogue window appears on screen.

11.) Select **OK** to continue.

8-9-8 Prepare MO Disk for Patient Archive - Software Version v2.x (cont'd)

12.) Verify the disk formatting status has been updated.

13.) Press **ALT-E.**

14.) Select the *5 1/4 MO Disk*, to eject Disk.

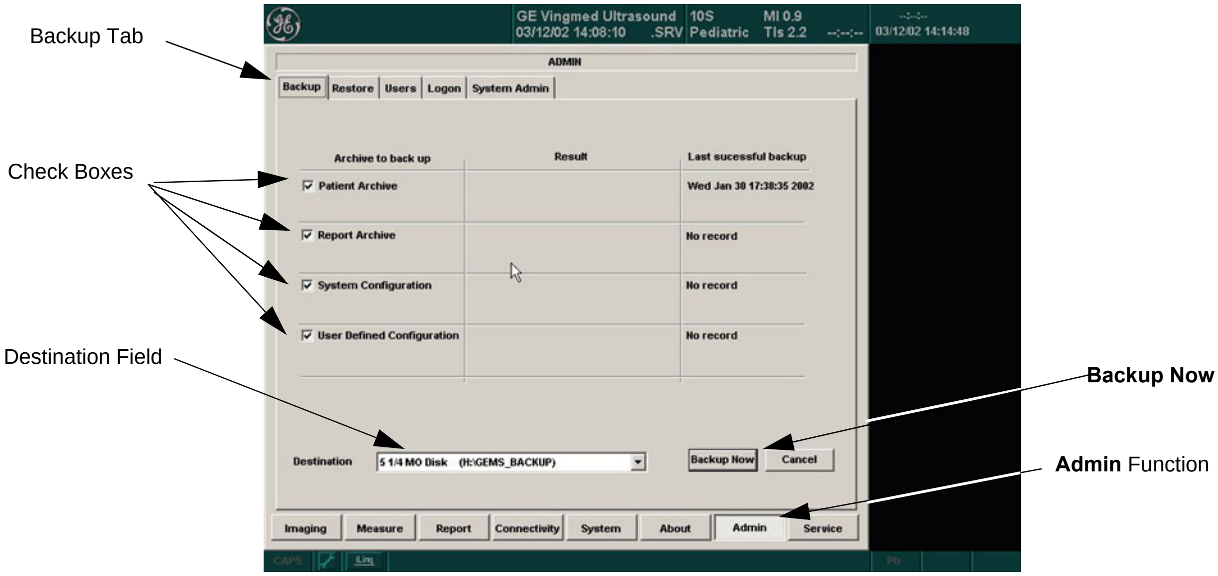
15.) *Optional:* Insert the MO disk, side B and repeat step 7 to 14.

8-9-9 Backup of Patient Database & User Presets - Software Version v2.x

This procedure describes how to backup Patient database and user presets (user defined configuration).

1.) Insert the formatted MO disk prepared for Backup in the MO Drive.

2.) Go to **CONFIG** -> **Admin** -> **Backup**.


Backup Tab
Check Boxes
Destination Field
Backup Now
Admin Function
GE Vingmed Ultrasound
03/12/02 14:08:10
.SRV
10S
Pediatric
MI 0.9
TIs 2.2
03/12/02 14:14:48
ADMIN
Backup
Restore
Users
Logon
System Admin
Backup Now
Cancel
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Archive to back up	Result	Last sucessful backup
☑ Patient Archive		Wed Jan 30 17:38:35 2002
☑ Report Archive		No record
☑ System Configuration		No record
☑ User Defined Configuration		No record

Destination: 5 1/4 MO Disk (H:\GEMS_BACKUP)

Figure 8-54 The Backup Screen

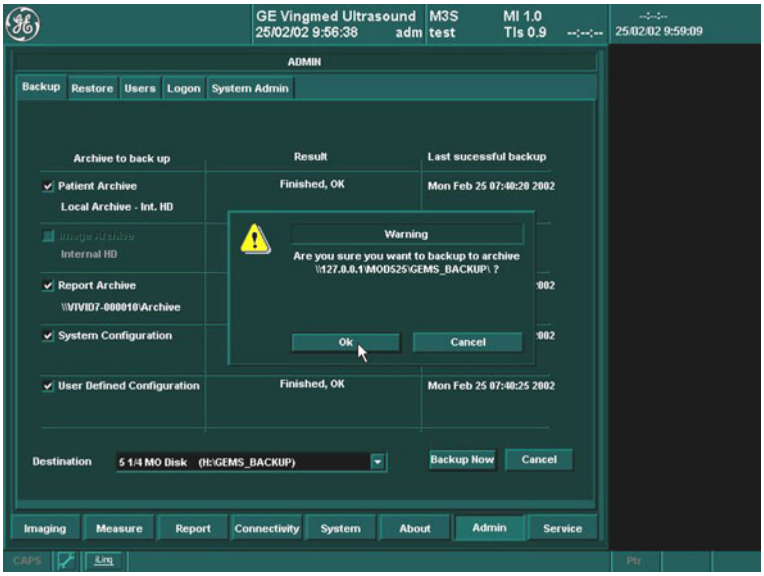
3.) Select all check boxes.

4.) In the Destination field, select the *MO disk* from the drop-down menu.

8-9-9 Backup of Patient Database & User Presets - Software Version v2.x (cont'd)

5.) Select **Backup now**. A Warning will appear on the screen, as shown in Figure 8-55 on page 8-61.

.


GE Vingmed Ultrasound
25/02/02 9:56:38
adm
M3S
test
MI 1.0
TIs 0.9
--:--:--
--:--:--
25/02/02 9:59:09
ADMIN
Backup
Restore
Users
Logon
System Admin
Ok
Cancel
Backup Now
Cancel
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Archive to back up	Result	Last sucessful backup
☑ Patient Archive Local Archive - Int. HD	Finished, OK	Mon Feb 25 07:40:20 2002
☐ Image Archive Internal HD		
☑ Report Archive \\VIVID7-000010\Archive		002
☑ System Configuration		002
☑ User Defined Configuration	Finished, OK	Mon Feb 25 07:40:25 2002

Destination: 5 1/4 MO Disk (H:\GEMS_BACKUP)

Warning

Are you sure you want to backup to archive \\127.0.0.1\MOD525\GEMS_BACKUP\ ?

Figure 8-55 Backup Warning

6.) Select **OK.**

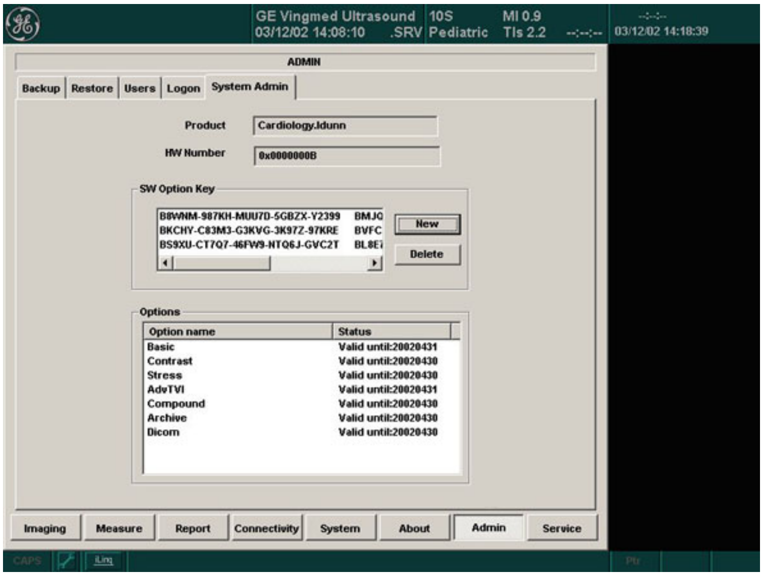
NOTE: *No process indicator will appear on screen. Verify that the "Finished, OK" Status appears in the Result column, and that the date appearing in the Last Successful Backup column is the current date and time. The backup is completed.*

7.) Remove the Backup MO Disk when the backup is completed.

8-9-10 Record SW Option Keys - Software Version v2.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) From the **Admin** tab, select **SYSTEM ADMIN**.


GE Vingmed Ultrasound
03/12/02 14:08:10
.SRV
10S
Pediatric
MI 0.9
TIs 2.2
03/12/02 14:18:39
ADMIN
Backup
Restore
Users
Logon
System Admin
New
Delete
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Product: Cardiology.Idunn

HW Number: 0x0000000B

SW Option Key

```
B8WNM-987KH-MUU7D-5GBZX-Y2399   BMJQ
BKCHY-C83M3-G3KVG-3K97Z-97KRE   BVFC
BS9XU-CT7Q7-46FW9-NTQ6J-GVC2T   BL8E
```

Options

Option name	Status
Basic	Valid until:20020431
Contrast	Valid until:20020430
Stress	Valid until:20020430
AdvTVI	Valid until:20020431
Compound	Valid until:20020430
Archive	Valid until:20020430
Dicom	Valid until:20020430

Figure 8-56 System Admin

3.) Record SW Options Keys from SW Options Key window.

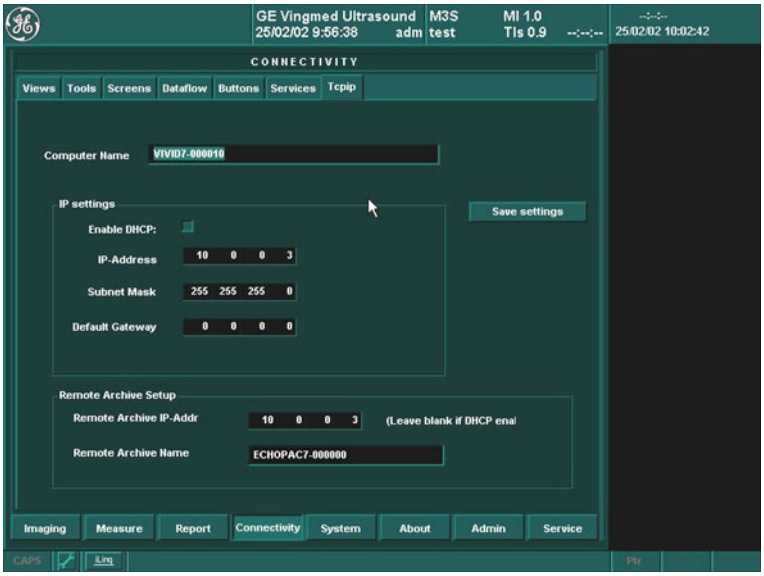
WARNING ***Make sure that the SW Option Keys (passwords) have been recorded correctly. If the key is incorrect, you will not be able to log on after the SW installation has been completed. The password is case sensitive. Hyphens must also be recorded. There may be more than one password.***

Table 8-15 SW Options Keys

SW OPTIONS KEYS

8-9-11 Record TCP/IP Settings - Software Version v2.x

1.) Select **Connectivity**.
2.) Select the **Tcpip** tab.
3.) Record all settings in Table 8-16 "Record settings from Tcpip screen (v2.x)" on page 8-63.


GE Vingmed Ultrasound
25/02/02 9:56:38
adm
M3S
test
MI 1.0
TIs 0.9
--:--:--
25/02/02 10:02:42
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Computer Name VIVID7-000010

IP settings

Enable DHCP: ☐

IP-Address 10 0 0 3

Subnet Mask 255 255 255 0

Default Gateway 0 0 0 0

Remote Archive Setup

Remote Archive IP-Addr 10 0 0 3 (Leave blank if DHCP enal

Remote Archive Name ECHOPAC7-000000

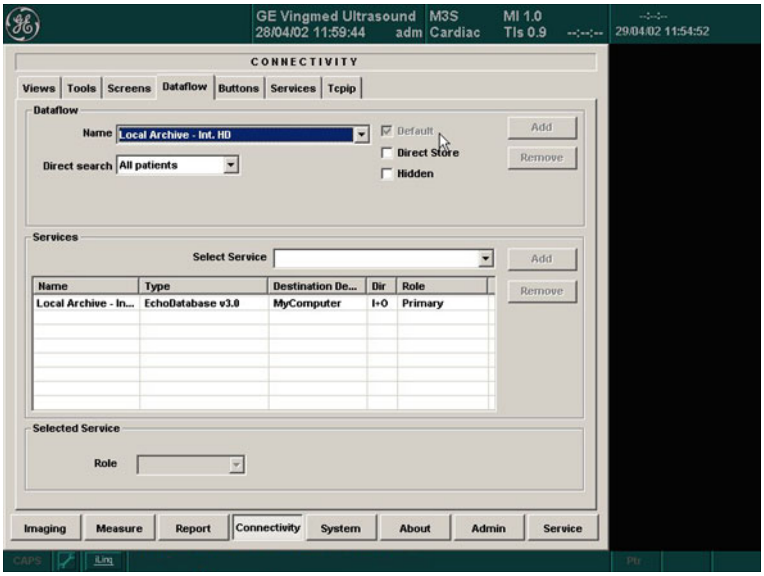
Figure 8-57 TCP/IP Example Settings

Table 8-16 Record settings from Tcpip screen (v2.x)

PARAMETER	VALUE
Computer Name	VIVID7-00 _ _ _ _
AE Title	VIVID7-00 _ _ _ _
IP Settings	
IP Address	_ _ _ . _ _ _ . _ _ _
Subnet mask	_ _ _ . _ _ _ . _ _ _
Default Gateway	_ _ _ . _ _ _ . _ _ _
Remote Archive Setup	
Remote Archive IP-Addr	_ _ _ . _ _ _ . _ _ _
Remote Archive Name	

8-9-12 Record Default Dataflow - Software Version v2.x

1.) In the **Connectivity** window, select **Dataflow**.


GE Vingmed Ultrasound
28/04/02 11:59:44
adm
M3S
Cardiac
MI 1.0
TIs 0.9
29/04/02 11:54:52
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Dataflow
Services
Selected Service
Role
Add
Remove
Add
Remove
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Name: Local Archive - Int. HD

Direct search: All patients

☑ Default

☐ Direct Store

☐ Hidden

Select Service:

Name	Type	Destination De...	Dir	Role
Local Archive - In...	EchoDatabase v3.0	MyComputer	I+O	Primary

Figure 8-58 Select Dataflow

2.) Verify that Default Dataflow is selected.

3.) Record Default Dataflow Name in table Table 8-17 on page 8-64.

Table 8-17 Record Default Dataflow Name

DEFAULT DATAFLOW NAME

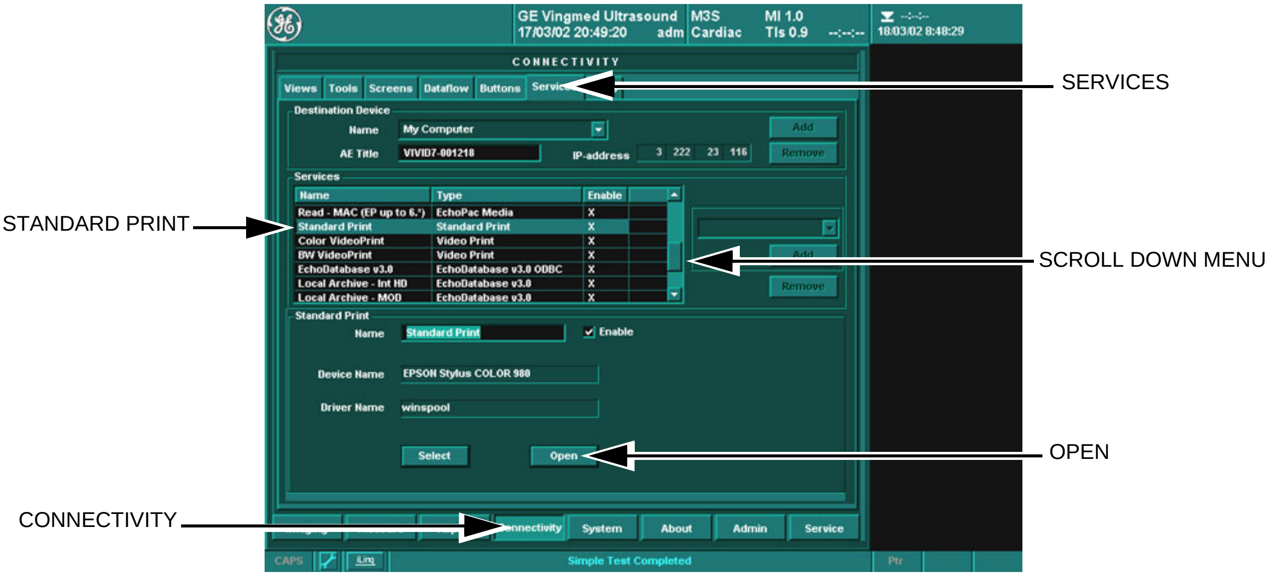
8-9-13 Record Standard Printer IP and Port Settings - Software Version v2.x

1.) In **Connectivity** window, select **Services**.

2.) In the *Services* list, Scroll down until *Standard Print* appears.

3.) Select *Standard Print*.

4.) Select **Open**.


GE Vingmed Ultrasound
17/03/02 20:49:20
adm
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:48:29
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
SERVICES
Add
Remove
STANDARD PRINT
SCROLL DOWN MENU
Select
Open
OPEN
CONNECTIVITY
System
About
Admin
Service
CAPS
Simple Test Completed
Ptr

Destination Device

Name: My Computer

AE Title: VIVID7-001218

IP-address: 3 222 23 116

Services

Name	Type	Enable
Read - MAC (EP up to 6.*)	EchoPac Media	X
Standard Print	Standard Print	X
Color VideoPrint	Video Print	X
BW VideoPrint	Video Print	X
EchoDatabase v3.0	EchoDatabase v3.0 ODBC	X
Local Archive - Int HD	EchoDatabase v3.0	X
Local Archive - MOD	EchoDatabase v3.0	X

Standard Print

Name: Standard Print ☑ Enable

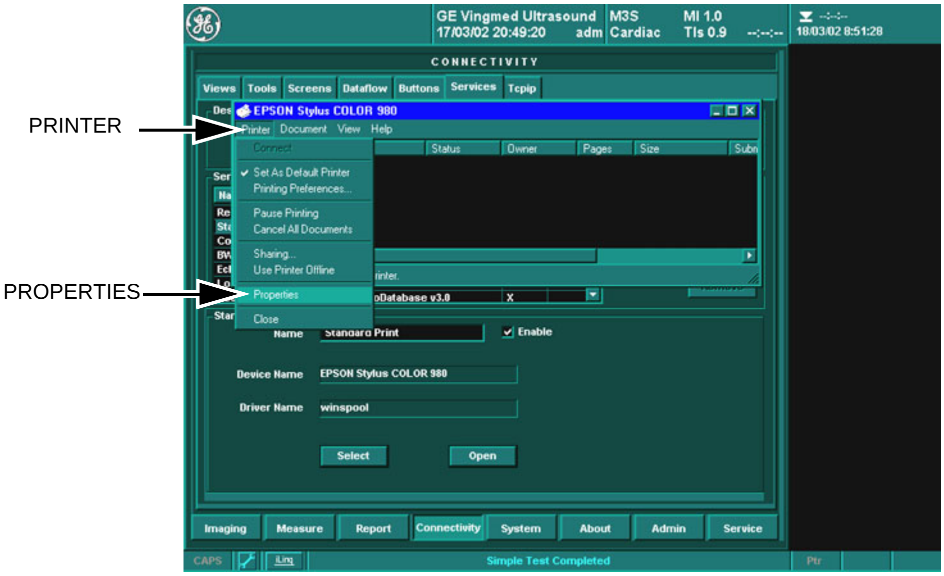
Device Name: EPSON Stylus COLOR 980

Driver Name: winspool

Figure 8-59 Choosing Standard Print

5.) Select *Printer* to open the Printer scroll down menu.

6.) Select *Properties* from the Printer scroll down menu.


GE Vingmed Ultrasound
17/03/02 20:49:20
adm
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:51:28
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
EPSON Stylus COLOR 980
Printer
Document
View
Help
PRINTER
Connect
Set As Default Printer
Printing Preferences...
Pause Printing
Cancel All Documents
Sharing...
Use Printer Offline
Properties
Close
PROPERTIES
Status
Owner
Pages
Size
Subm
Select
Open
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
Simple Test Completed
Ptr

Name: Standard Print ☑ Enable

Device Name: EPSON Stylus COLOR 980

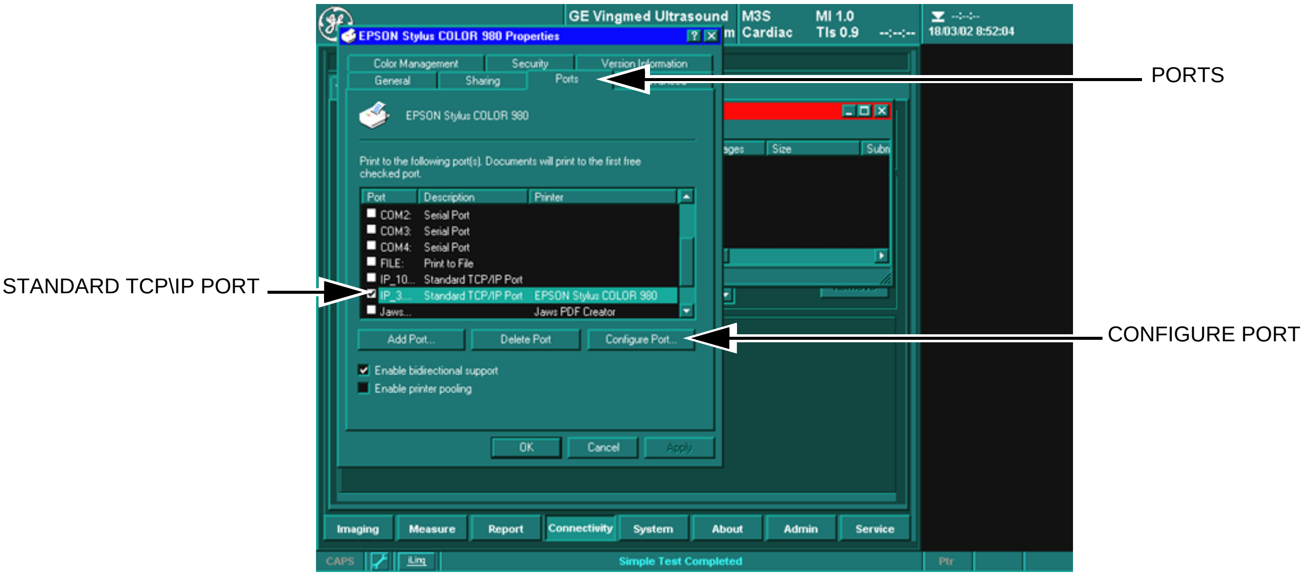
Driver Name: winspool

Figure 8-60 Properties

8-9-13 Record Standard Printer IP and Port Settings - Software Version v2.x (cont'd)

7.) Select *Ports*.

8.) Select *Standard TCP\IP Port*.


PORTS
STANDARD TCP\IP PORT
CONFIGURE PORT
GE Vingmed Ultrasound
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:52:04
EPSON Stylus COLOR 980 Properties
Color Management
Security
Version Information
General
Sharing
Ports
Add Port...
Delete Port
Configure Port...
OK
Cancel
Apply
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

EPSON Stylus COLOR 980

Print to the following port(s). Documents will print to the first free checked port.

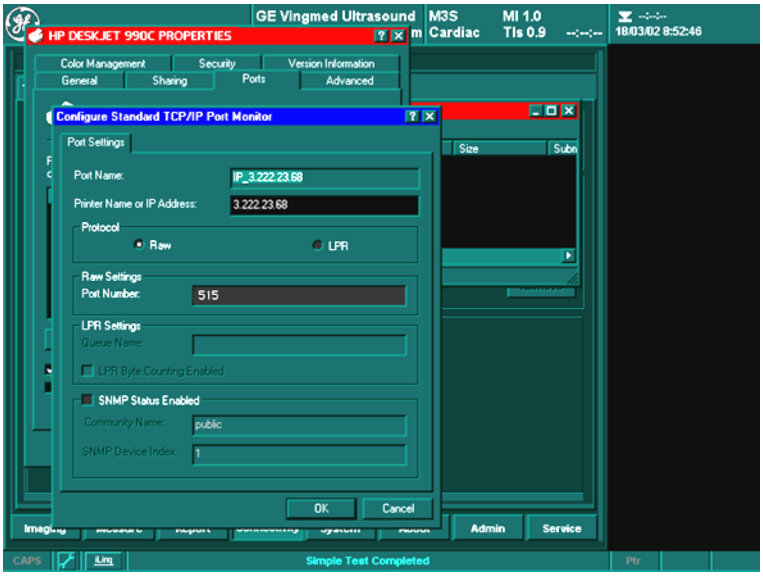
Port	Description	Printer
☐ COM2:	Serial Port	
☐ COM3:	Serial Port	
☐ COM4:	Serial Port	
☐ FILE:	Print to File	
☐ IP_10...	Standard TCP/IP Port	
☑ IP_3....	Standard TCP/IP Port	EPSON Stylus COLOR 980
☐ Jaws...		Jaws PDF Creator

☑ Enable bidirectional support
☐ Enable printer pooling

Simple Test Completed

Figure 8-61 Configure Port

9.) Select **Configure Port**.


GE Vingmed Ultrasound
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:52:46
HP DESKJET 990C PROPERTIES
Color Management
Security
Version Information
General
Sharing
Ports
Advanced
Configure Standard TCP/IP Port Monitor
Port Settings
OK
Cancel
Admin
Service
CAPS
iLinq
Ptr

Port Name: IP_3.222.23.68
Printer Name or IP Address: 3.222.23.68
Protocol
● Raw ○ LPR
Raw Settings
Port Number: 515
LPR Settings
Queue Name:
☐ LPR Byte Counting Enabled
☐ SNMP Status Enabled
Community Name: public
SNMP Device Index: 1

Simple Test Completed

Figure 8-62 Configure Port (Port Settings dialog)

8-9-13 Record Standard Printer IP and Port Settings - Software Version v2.x (cont'd)

10.) Select and record *Printer Name or IP Address* in Table 8-18 on page 8-67.

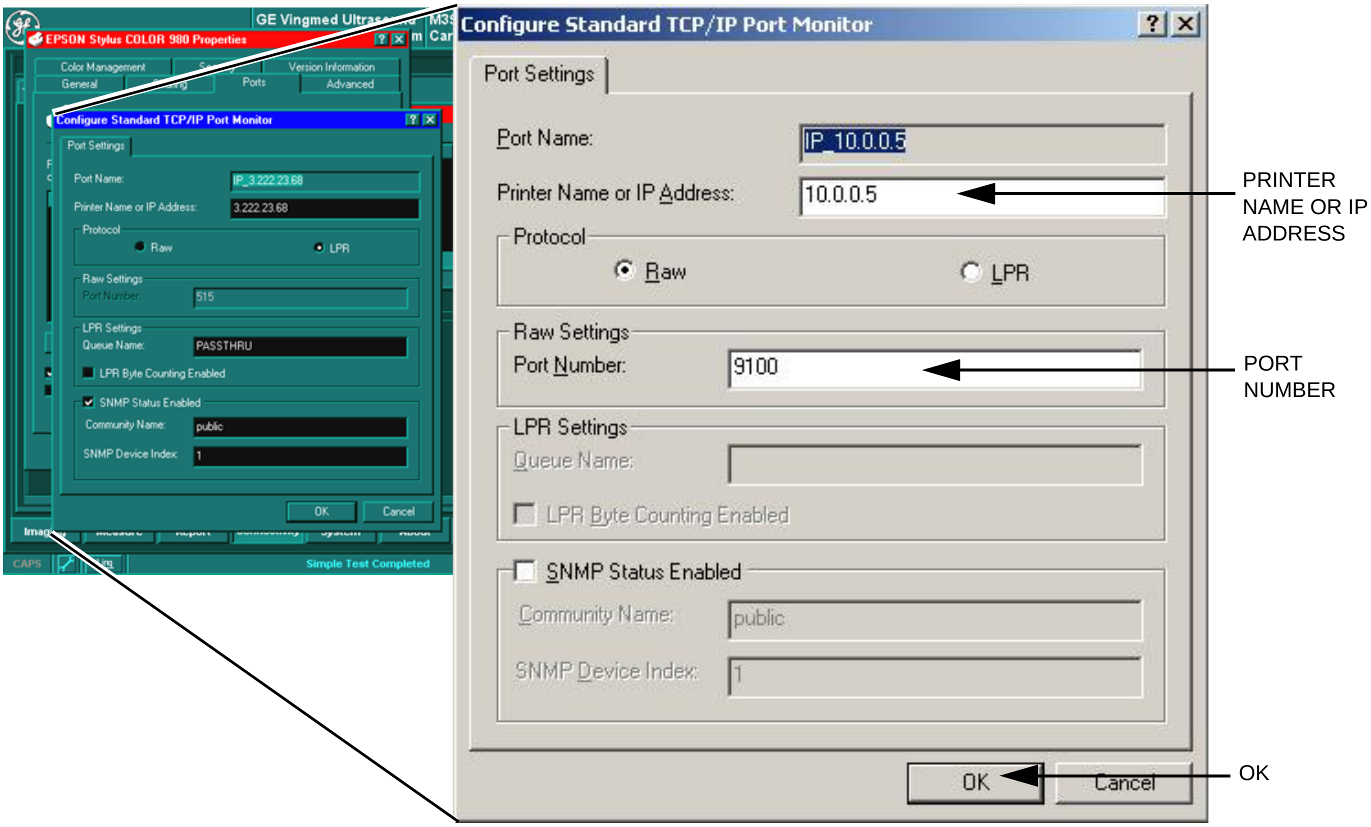
11.) Select *Raw*.

12.) Select and record *Port Number* in Table 8-18 on page 8-67.

Table 8-18 Printer Name or IP Address and Port Number

PRINTER NAME OR IP ADDRESS	PORT NUMBER

13.) Select **Cancel**.



Configure Standard TCP/IP Port Monitor

Port Settings

Port Name: IP_10.0.0.5

Printer Name or IP Address: 10.0.0.5

Protocol: ● Raw ○ LPR

Raw Settings: Port Number: 9100

LPR Settings: Queue Name:

☐ LPR Byte Counting Enabled

☐ SNMP Status Enabled

Community Name: public

SNMP Device Index: 1

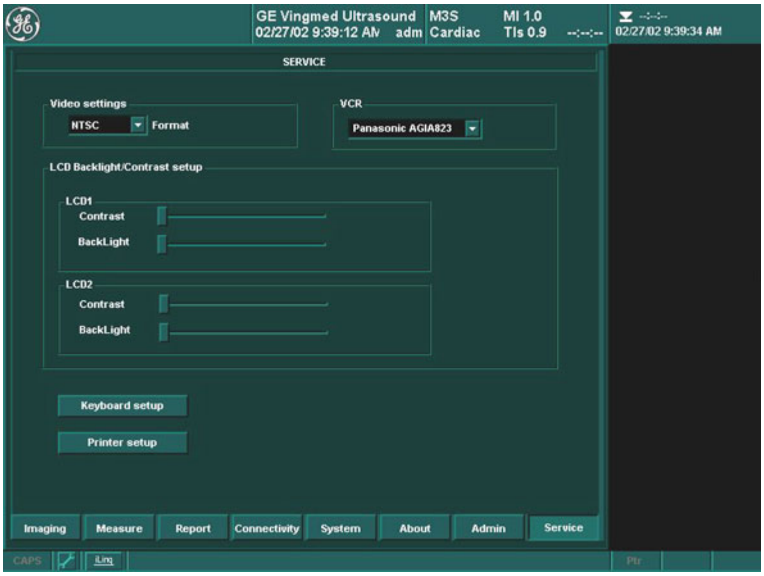
Figure 8-63 Configure Port

14.) Close rest of the Windows by selecting **Ok**.

8-9-13-1 Record Service Settings - Software Version v2.x

1.) Select **Service**.

.


GE Vingmed Ultrasound
02/27/02 9:39:12 AM
adm
M3S
Cardiac
MI 1.0
TIs 0.9
02/27/02 9:39:34 AM
SERVICE
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Keyboard setup
Printer setup
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
Ptr

Video settings
NTSC Format

VCR
Panasonic AGIA823

Figure 8-64 Service Settings

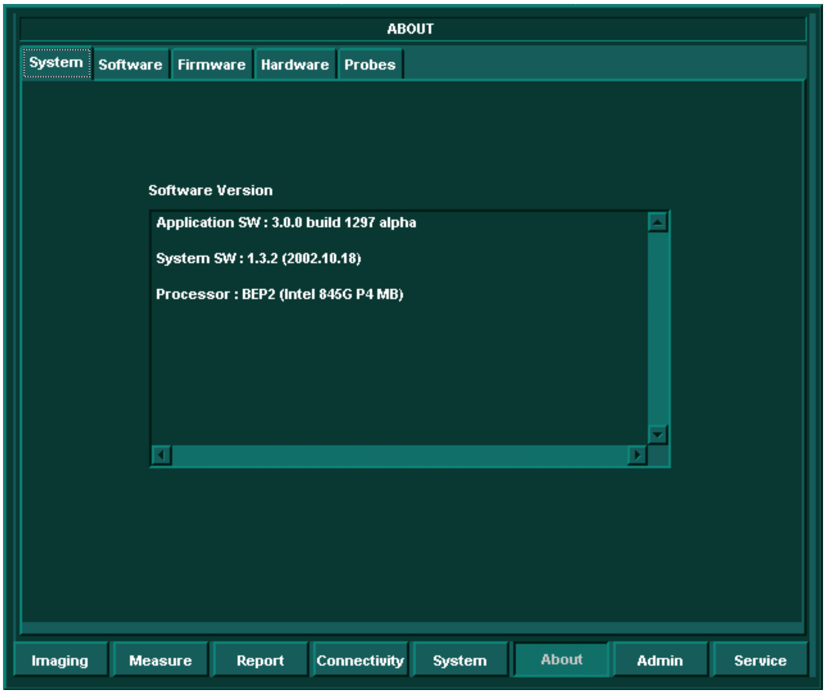
2.) Record Video Setting Format and VCR Type in Table 8-19 "Video Settings and VCR Type" on page 8-68.

Table 8-19 Video Settings and VCR Type

Video Setting Format	VCR Type

8-9-13-2 Information on the About tab - Software Version v2.x

1.) Select the **About** tab.


ABOUT
System
Software
Firmware
Hardware
Probes
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Software Version

Application SW : 3.0.0 build 1297 alpha

System SW : 1.3.2 (2002.10.18)

Processor : BEP2 (Intel 845G P4 MB)

Figure 8-65 Information available on the About tab

2.) Record Application software version, System software version and Processor model (BEP) in Table 8-20 "Record Software and hardware versions" on page 8-69.

Table 8-20 Record Software and hardware versions

DESCRIPTION	RECORD VERSION
APPLICATION SW	
SYSTEM SW	
PROCESSOR (BEP)	

8-9-14 Software Loading - Software Version v2.x

8-9-14-1 Overview

This software loading procedure covers:

- Installation of BT'02 Software (application software version v2.x) on Vivid 7 units.

Table 8-21 Vivid 7 Models Versus Minimum Software Requirement

GE VINGMED PART NUMBER	DESCRIPTION	APPLICATION SOFTWARE VERSION
FB000030	VIVID 7 (BT'01)	V2.3.1 (or higher)
FC000060	VIVID 7 (BT'01)	V2.3.1 (or higher)
FC000180	VIVID 7 PRO (BT'02)	V2.3.1 (or higher)
FC000190	VIVID 7 PRO (BT'02)	V2.3.1 (or higher)
FC000200	VIVID 7 (BT'02)	V2.3.1 (or higher)
FC000210	VIVID 7 (BT'02)	V2.3.1 (or higher)

Refer to Table 8-20 on page 8-69 where you recorded the unit's software versions.

The software for Vivid 7 is divided on two CDs, one CD with the System Software and one with the Application Software.

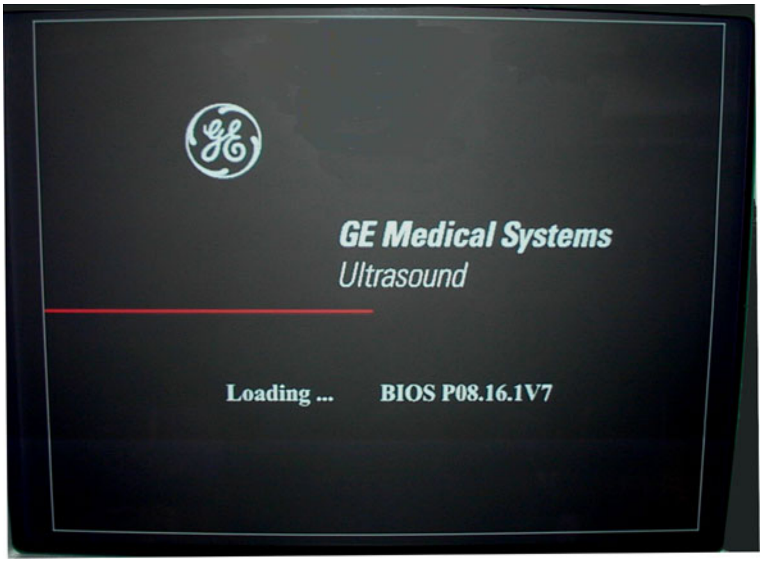
8-9-14-2 Vivid 7 System Software Loading - Software Version v2.x

1.) Insert the applicable *Vivid 7 System Software CD* into the CD drive, see Table 8-20 "Record Software and hardware versions" on page 8-69.

2.) Power down the System, see 4-2-3 "Power Shut Down" on page 4-7.

3.) Wait until the LCD's on the Operator Panel are switched off and the ON/Standby switch has turned amber.

4.) Power ON the System, see 4-2-2 "Power ON/ Boot UP" on page 4-3. The scanner will now boot from the CD you inserted.



Loading ... BIOS P08.16.1V7

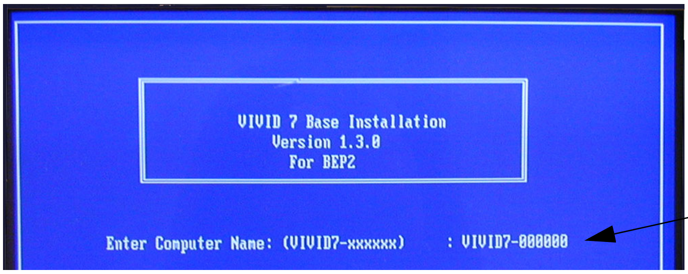
Figure 8-66 BIOS loading example

8-9-14-2 Vivid 7 System Software Loading - Software Version v2.x (cont'd)

5.) When requested, enter the missing part of the Computer Name (the unit's serial number) as you recorded it in Table 8-16 "Record settings from Tcpip screen (v2.x)" on page 8-63.

Example: VIVID7-001890

Always enter two zeros before you enter the serial number. This means that when you have a serial number which is 1890 you enter 001890. When the serial number is 1123 you enter 001123.



```
VIVID 7 Base Installation
Version 1.3.0
For BEP2

Enter Computer Name: (VIVID7-xxxxxx)     : VIVID7-000000
```

Enter the Serial Number here

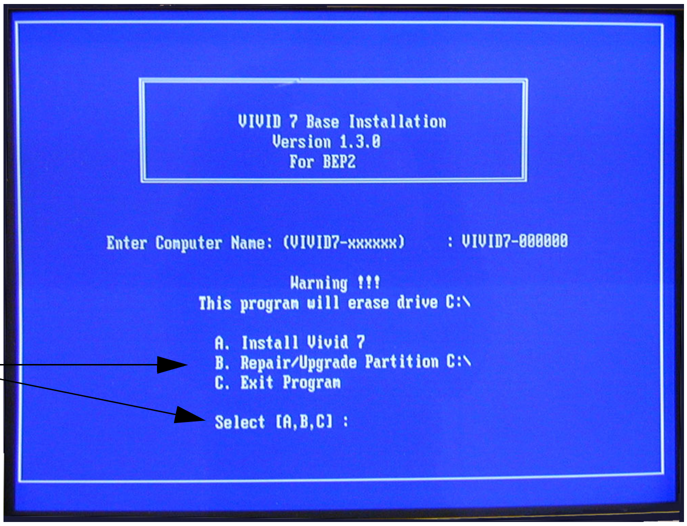
Figure 8-67 Serial Number entry example

NOTICE If you select "**A**" in the next step, ALL existing software and data on the hard disk will be erased. If backup has not been performed as described earlier in this manual, all data like Patient Database, System Configuration and User Configurations (Customer Presets), will be lost.

6.) In this step, you can choose if you want to do a complete Vivid 7 installation or if you only want to update or reinstall the software on the C:\ partition (C:\ drive).

Usually it should be OK to select "**B**" to update the C-drive only. This will keep Presets etc.

- a.) Press **B** to update/re-install the software on the C:\ partition. (Only data on the C:\ partition will be erased. System configurations etc. will be kept.) Continue with step 7.
- b.) Use ONLY if a "B" update cannot be used: Press **A** to do a complete Vivid 7 software installation. (All data will be erased.)
- c.) Press **C** to Exit.



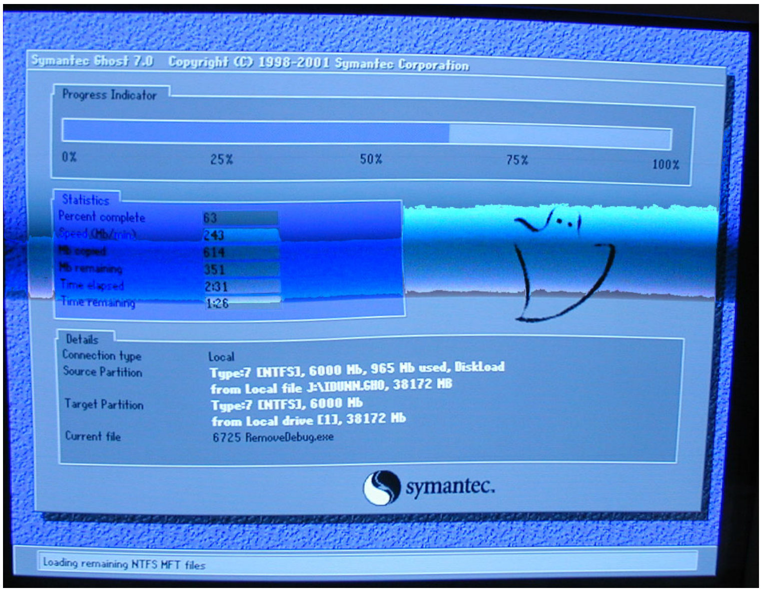
```
VIVID 7 Base Installation
Version 1.3.0
For BEP2

Enter Computer Name: (VIVID7-xxxxxx)     : VIVID7-000000

Warning !!!
This program will erase drive C:\

A. Install Vivid 7
B. Repair/Upgrade Partition C:\
C. Exit Program

Select [A,B,C] :
```

Press A, B or C to choose the wanted option.

Figure 8-68 Info entry page

8-9-14-2 Vivid 7 System Software Loading - Software Version v2.x (cont'd)

7.) The Software loader program starts and the below Time Bar Info Screen appears.



Symantec Ghost 7.0 Copyright (C) 1998-2001 Symantec Corporation

Statistics
Percent complete 63
Speed (Mb/min) 243
Mb copied 614
Mb remaining 351
Time elapsed 2:31
Time remaining 1:26

Details
Connection type Local
Source Partition Type:7 [NTFS], 6000 Mb, 965 Mb used, DiskLoad
from Local file J:\IDUNN.GHO, 38172 MB
Target Partition Type:7 [NTFS], 6000 Mb
from Local drive [1], 38172 Mb
Current file 6725 RemoveDebug.exe

Loading remaining NTFS MFT files

Figure 8-69 Software Loading Underway
(Picture distorted here due to photo technical limitations, it should look OK on screen)

WARNING ***Do not interrupt the SW loading at any time.***

8.) Wait for the SW Installation to be completed. (Typical installation time: 5 minutes). Status bar on the screen indicates process.

9.) You will now be prompted to remove the first CD and restart the unit when the SW Installation is completed. Remove the CD, but **don't restart the System this time**. The next step is to load the application software.

8-9-14-3 Application SW Installation - Software Version v2.x

1.) Insert the applicable CD labelled *Vivid7 & EchoPAC PC Application SW*, see Table 8-14 "CDs with BT'02 Software, Version v2.x" on page 8-55.

2.) Keep the ON/Standby switch on the operator panel pressed for a few seconds to power down the scanner. (This is called Forced Shut Down).

3.) Wait until the LCD's on the Operator Panel is switched OFF and the ON/Standby Switch on the Operator Panel has turned yellow.

4.) Power ON the System, see 4-2-2 "Power ON/ Boot UP" on page 4-3.

5.) When the dialogue box named *Start Application* appear, select **Install SW**.

6.) A dialogue box, named Startloader, will appear, select **OK** to continue.

7.) A dialogue box will appear, also named Startloader stating “New System SW installation will start now”, select **OK** to continue.

8.) A Command prompt window will appear, hit any key on the alphanumeric keyboard to continue.

9.) A message in the Command prompt window may prompt you that copying application software takes three minutes. This may take as much as five minutes.

10.) Several dialogue boxes will appear on the screen during the SW load.

WARNING ***DO NOT INTERRUPT THE SOFTWARE LOADING AT ANY TIME.***

11.) Remove the CD from the CD drive when prompted.

12.) Press any key to continue.

13.) The Scanner will now power down and reboot.

8-9-15 Verifications - Software Version v2.x

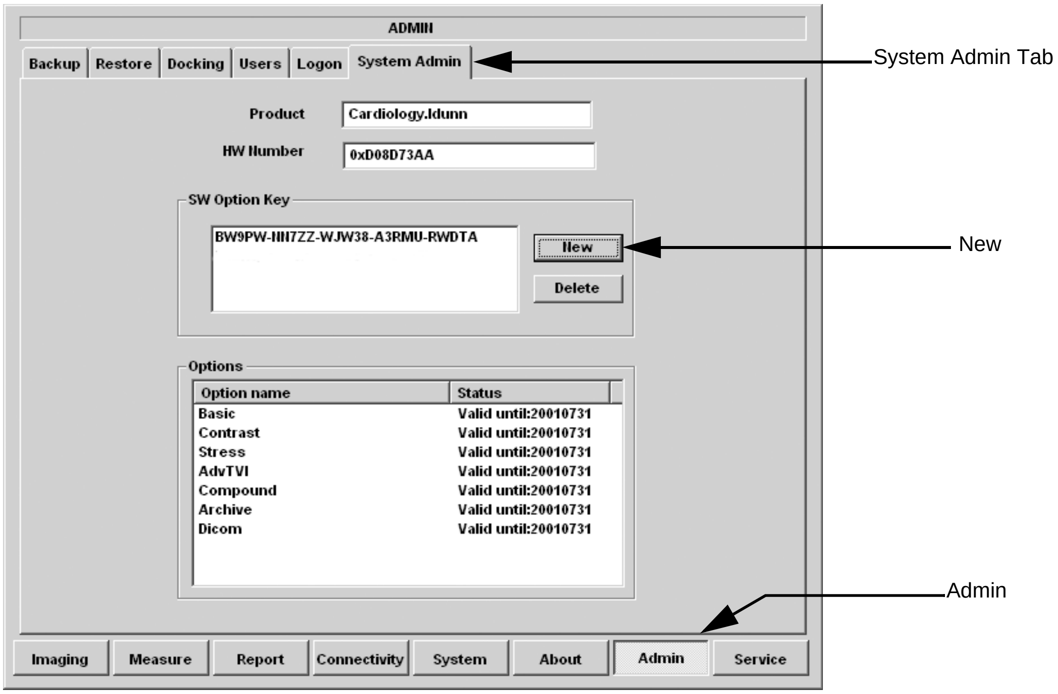
NOTE: *Software Option Strings are software version dependant. If a new software version has been installed, please follow installation instructions for that software. Usually, new software option strings are needed.*

8-9-15-1 Verify Software Option Key Settings - Software Version v2.x

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **Admin** (lower part of window),

3.) Select the **SYSTEM ADMIN** tab.


ADMIN
Backup
Restore
Docking
Users
Logon
System Admin
SW Option Key
New
Delete
Options
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
System Admin Tab
New
Admin

Product: Cardiology.ldunn

HW Number: 0xD08D73AA

SW Option Key: BW9PW-NN7ZZ-WJW38-A3RMU-RWDTA

Option name	Status
Basic	Valid until:20010731
Contrast	Valid until:20010731
Stress	Valid until:20010731
AdvTVI	Valid until:20010731
Compound	Valid until:20010731
Archive	Valid until:20010731
Dicom	Valid until:20010731

Figure 8-70   System Admin screen

4.) Verify that the SW Options Keys (alphanumeric strings) in the SW Options Key window are the same as recorded in 8-9-10 "Record SW Option Keys - Software Version v2.x" on page 8-62.

5.) Select **New** to open the New Key dialog where you can type any missing Software Option Key(s) (alphanumeric string(s)).

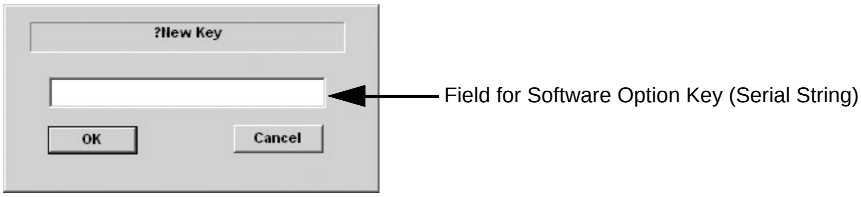
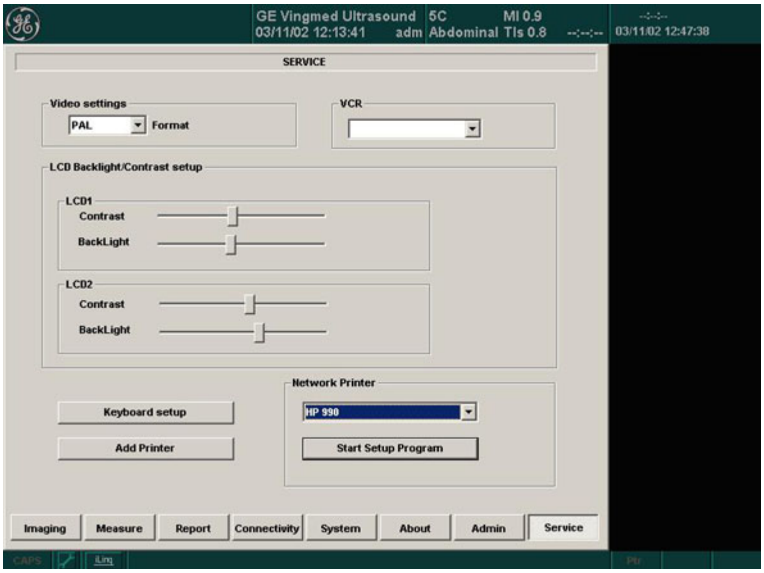

?New Key
OK
Cancel
Field for Software Option Key (Serial String)

Figure 8-71   Type Software Option Key

8-9-15-2 Verify Video and VCR Settings - Software Version v2.x

1.) Select **Service** (lower, right corner)

.



GE Vingmed Ultrasound 5C MI 0.9
03/11/02 12:13:41 adm Abdominal TIs 0.8 --:--:-- 03/11/02 12:47:38

Video settings: Format PAL

Network Printer: HP 990

SERVICE
Video settings
Format
VCR
LCD Backlight/Contrast setup
LCD1
Contrast
BackLight
LCD2
Contrast
BackLight
Network Printer
Keyboard setup
Add Printer
Start Setup Program
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

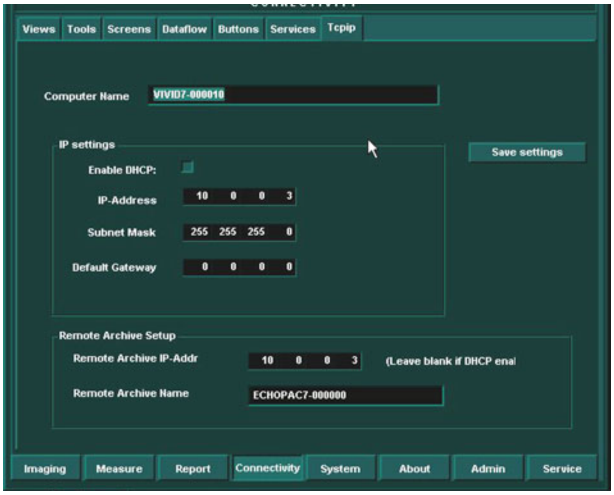
Figure 8-72 Video Settings

2.) From Video Settings pull down menu, verify *Format* as recorded in Table 8-19 "Video Settings and VCR Type" on page 8-68. Correct the selection if needed.

3.) From the VCR pull down menu, verify *VCR type* as recorded in Table 8-19 on page 8-68. Correct the selection if needed.

8-9-15-3 Verify TCP/IP Settings - Software Version v2.x

1.) From the top of the connectivity tab, select the **Tcpip** tab.



Computer Name: VIVID7-000010

IP settings
Enable DHCP: ☐
IP-Address: 10 0 0 3
Subnet Mask: 255 255 255 0
Default Gateway: 0 0 0 0

Remote Archive Setup
Remote Archive IP-Addr: 10 0 0 3 (Leave blank if DHCP enal
Remote Archive Name: ECHOPAC7-000000

Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
Save settings
Imaging
Measure
Report
Connectivity
System
About
Admin
Service

Figure 8-73 TCP/IP Example Settings

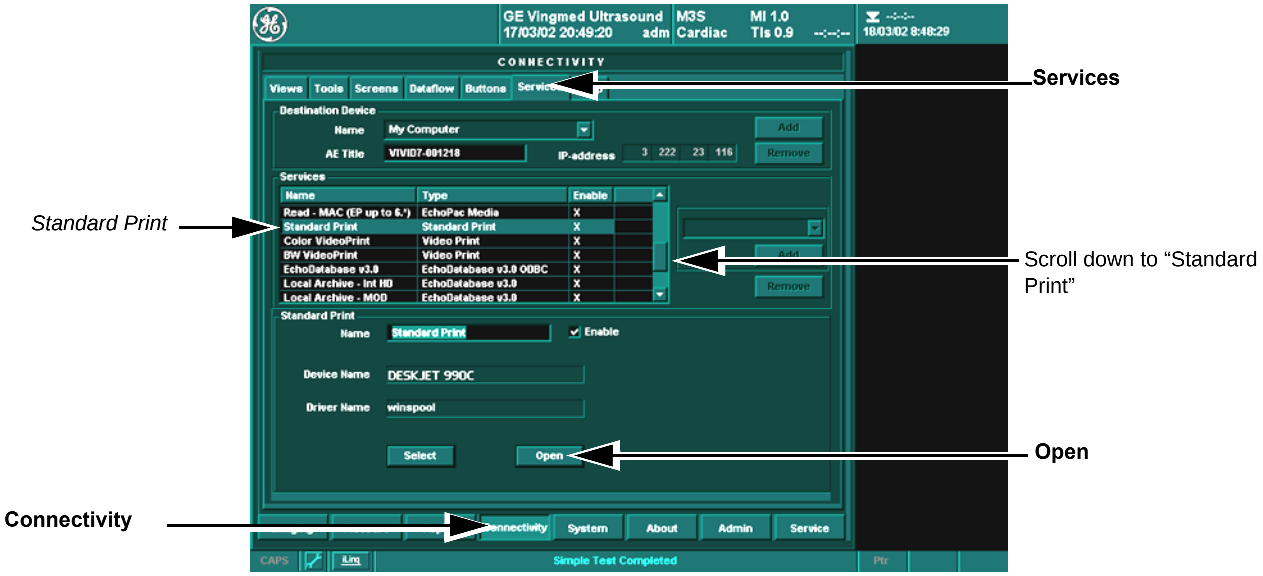
2.) Verify that all settings on the TCPIP tab matches those recorded in Table 8-16 "Record settings from Tcpip screen (v2.x)" on page 8-63.

3.) Select **Save settings**.

4.) Select **Ok** to continue.

8-9-16 Restore Standard Printer IP and Port Settings - Software Version v2.x

1.) Select **Connectivity**.
2.) Select **Service**.
3.) Select *Standard Print*.
4.) Select **Open**.


GE Vingmed Ultrasound
17/03/02 20:49:20
adm
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:48:29
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Add
Remove
Add
Remove
Select
Open
Connectivity
System
About
Admin
Service
CAPS
iLinq
Ptr

Destination Device
Name: My Computer
AE Title: VIVID7-001218
IP-address: 3 222 23 116

Services

Name	Type	Enable
Read - MAC (EP up to 6.*)	EchoPac Media	X
Standard Print	Standard Print	X
Color VideoPrint	Video Print	X
BW VideoPrint	Video Print	X
EchoDatabase v3.0	EchoDatabase v3.0 ODBC	X
Local Archive - Int HD	EchoDatabase v3.0	X
Local Archive - MOD	EchoDatabase v3.0	X

Standard Print
Name: Standard Print ☑ Enable
Device Name: DESKJET 990C
Driver Name: winspool

Simple Test Completed

Services

Standard Print

Scroll down to “Standard Print”

Open

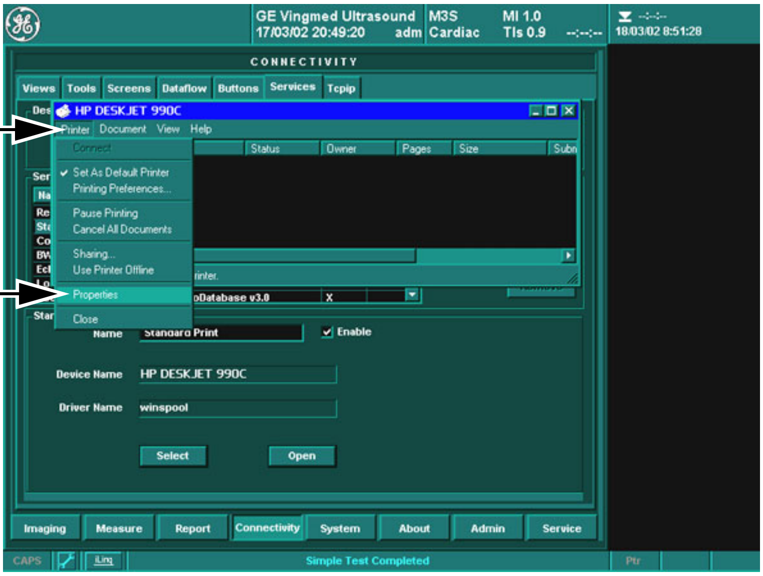
Connectivity

Figure 8-74 Choose Standard Printer

8-9-16 Restore Standard Printer IP and Port Settings - Software Version v2.x (cont'd)

5.) Select *Printer*.

6.) Select *Properties*.


GE Vingmed Ultrasound M3S MI 1.0
17/03/02 20:49:20 adm Cardiac TIs 0.9
18/03/02 8:51:28
CONNECTIVITY
Views
Tools
Screens
Dataflow
Buttons
Services
Tcpip
HP DESKJET 990C
Printer
Document
View
Help
Connect
Set As Default Printer
Printing Preferences...
Pause Printing
Cancel All Documents
Sharing...
Use Printer Offline
Properties
Close
Status
Owner
Pages
Size
Subm
Select
Open
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
Simple Test Completed
Ptr

Name: Standard Print ☑ Enable

Device Name: HP DESKJET 990C

Driver Name: winspool

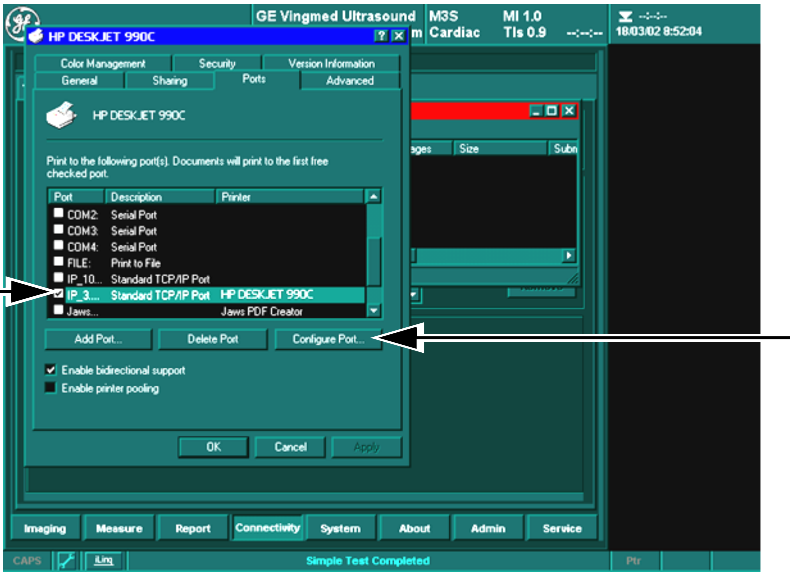
Printer

Properties

Figure 8-75 Properties

7.) Select *Standard TCP\IP Port*.

8.) Select **Configure Port**.


GE Vingmed Ultrasound M3S MI 1.0
Cardiac TIs 0.9
18/03/02 8:52:04
HP DESKJET 990C
Color Management
Security
Version Information
General
Sharing
Ports
Advanced
HP DESKJET 990C
Add Port...
Delete Port
Configure Port...
OK
Cancel
Apply
Imaging
Measure
Report
Connectivity
System
About
Admin
Service
CAPS
Simple Test Completed
Ptr

Print to the following port(s). Documents will print to the first free checked port.

Port	Description	Printer
☐ COM2:	Serial Port	
☐ COM3:	Serial Port	
☐ COM4:	Serial Port	
☐ FILE:	Print to File	
☐ IP_10...	Standard TCP/IP Port	
☑ IP_3...	Standard TCP/IP Port	HP DESKJET 990C
☐ Jaws...		Jaws PDF Creator

☑ Enable bidirectional support

☐ Enable printer pooling

Standard TCP\IP Port.

Configure Port

Figure 8-76 Configure Port

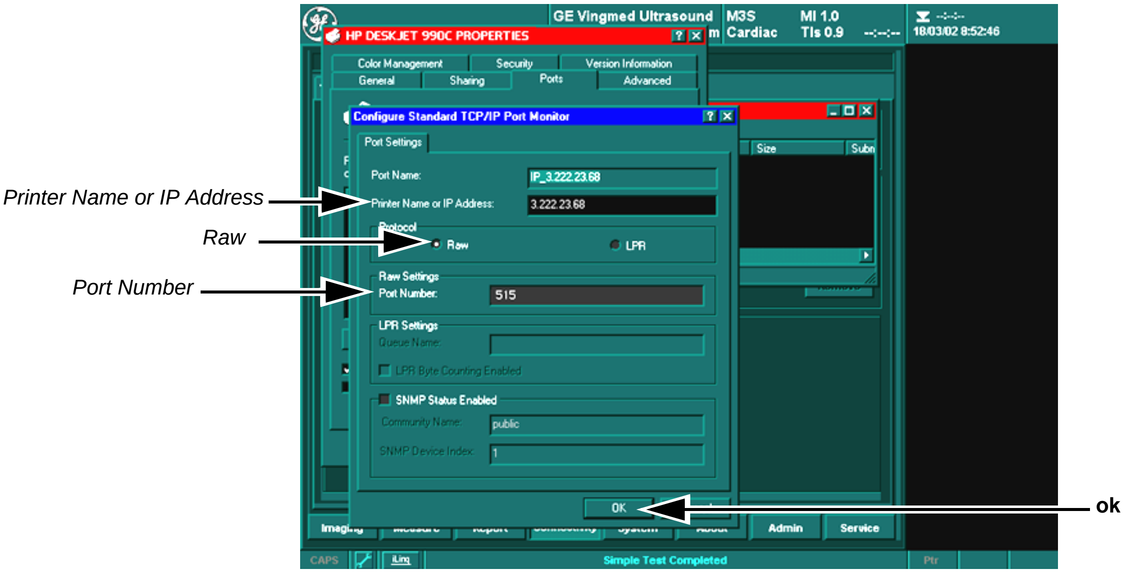
8-9-16 Restore Standard Printer IP and Port Settings - Software Version v2.x (cont'd)

9.) Verify *Printer Name or IP Address* as recorded in Table 8-18 on page 8-67.

10.) Select *Raw*.

11.) Verify *Port Number* as recorded in Table 8-18 on page 8-67.

12.) Select **ok**.


Printer Name or IP Address
Raw
Port Number
ok
GE Vingmed Ultrasound
M3S
Cardiac
MI 1.0
TIs 0.9
18/03/02 8:52:46
HP DESKJET 990C PROPERTIES
Color Management
Security
Version Information
General
Sharing
Ports
Advanced
Size
Subn
OK
Imaging
Admin
Service
CAPS
iLinq
Simple Test Completed
Ptr

Configure Standard TCP/IP Port Monitor

Port Settings

Port Name: IP_3.222.23.68

Printer Name or IP Address: 3.222.23.68

Protocol: ● Raw ○ LPR

Raw Settings

Port Number: 515

LPR Settings

Queue Name:

☐ LPR Byte Counting Enabled

☐ SNMP Status Enabled

Community Name: public

SNMP Device Index: 1

Figure 8-77 Configure Port

13.) Close the rest of the Windows by selecting **ok**.

8-9-16-1 DC Offset Calibration

1.) Disconnect all probes.

2.) From the upper section of the window, select **Test**.

3.) Then select **Go to System Test.**

4.) From the Module selection block, select **DC Offs. Cal**.

5.) Reboot the System when the DC Offset Calibration has been completed.

8-9-16-2 Verify System Software Version

1.) Press **CONFIG** (**F2**) and log on as *adm*, see 4-2-4 "Log On to the System as 'ADM'" on page 4-12.

2.) Select **About** tab.

3.) Verify that the SW versions are the same as what were recorded in Table 8-20 "Record Software and hardware versions" on page 8-69.

8-9-17 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-10
BEP Filter Assembly Replacement Procedure

8-10-1 Manpower

One person, 5 minutes

8-10-2 Tools

No tool required for installation and removal of the Filter Assembly.

8-10-3 Preparations

None

8-10-4 BEP Filter Removel Procedure

Follow these steps to remove the Filter Assembly:

1.) Press down the upper rib and pull out the upper part of the assembly before removing it completely.

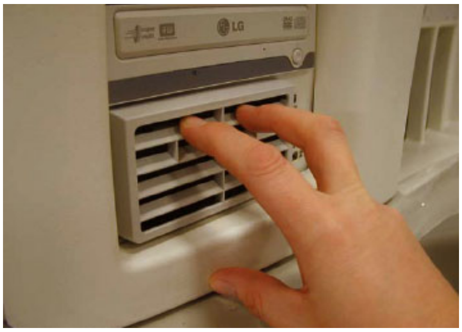


Figure 8-78 BEP Filter ASSY removal

2.) Lift the filter assembly away.

8-10-5 BEP Filter Installation Procedure

Follow these steps to remove the Filter Assembly:

1.) Place the two lower tags into the opening in the BEP.

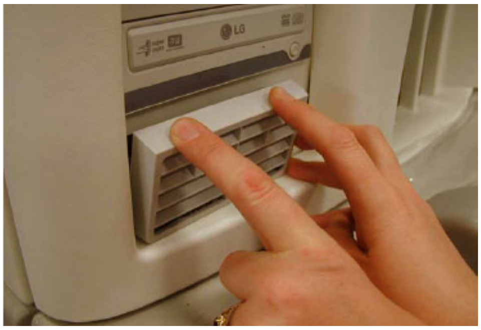


Figure 8-79 BEP Filter ASSY installation

2.) Push the upper part of the Filter Assembly against the BEP until the assembly is fixed by a click.

8-10-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-11
AC Power Replacement Procedure

8-11-1 Manpower

One person, 1 hour.

8-11-2 Tools

#2 Phillips screwdriver

⚠ DANGER **Dangerous voltages are present in this equipment. Completely power off and shut down the scanner before servicing.**

8-11-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Remove Right Side Cover, see "Side Covers Removal Procedure" on page 8-4.
3.) Remove Filter Cover, see "Upper Rear Cover Removal Procedure" on page 8-6.
4.) Remove Lower Rear Cover, see "Lower Rear Cover Removal Procedure" on page 8-10.

NOTE: The Power Supply, as delivered in a Vivid 7, has been configured for either 115 VAC or 230 VAC. Do not interchange the two types and don't try to reconfigure the Power Supply for use on another voltage; the Mains Circuit Breaker are different between the two types.

5.) Do this step if the intention is to change to another AC Power Supply:
   - Record the voltage for the AC Power Supply being replaced (see label on rear of system).
     ___ - 115VAC or ___ - 230VAC.

8-11-4 AC Power Removal Procedure

1.) Disconnect Speed Control cable, Fan cable and Input Voltage cable.

2.) Remove four (4) screws holding AC Power.

3.) Turn AC Power Module to get better access and unplug the rest of the cables. Make sure each connector and socket are properly marked, and easy to identify during installation.

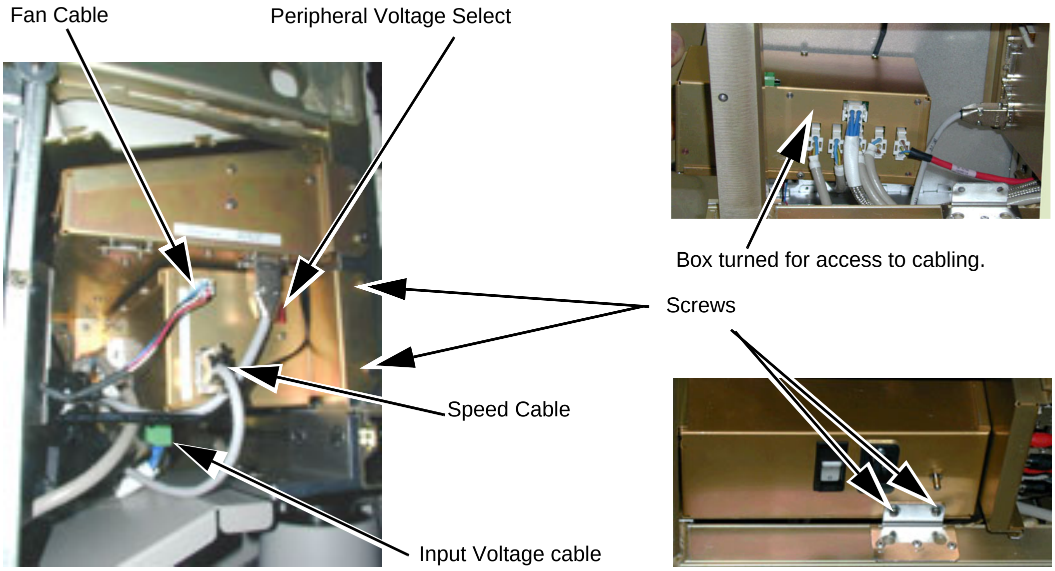

Fan Cable
Peripheral Voltage Select
Box turned for access to cabling.
Screws
Speed Cable
Input Voltage cable

Figure 8-80 AC Power Module

8-11-5 AC Power Installation Procedure

DANGER Before installing a replacement unit, verify that the power selector on the AC Power Module is set to the correct voltage for the peripherals used on the system.

1.) Connect the cables. You may need to leave the Speed Control cable and the Fan cable unconnected until you have fastened the unit. Input Voltage connector and socket are coded to prevent mistakes. In 115V system the connector matches one end of the 8-holed socket. In 230V system it matches the other end of the socket. Figure 8-81 is on a 230V system, and the connector can only be plugged in the right end of the socket.

2.) Fasten AC Power Module for correct Voltage and connect the remaining cables.

3.) Install Lower Rear Cover, see "Lower Rear Cover Installation Procedure" on page 8-10.

4.) Install Filter Cover, see "Upper Rear Cover Installation Procedure" on page 8-6.

5.) Install Right Side Cover, see "Side Covers Installation Procedure" on page 8-5.

6.) Do functional check-out, see Chapter 4.

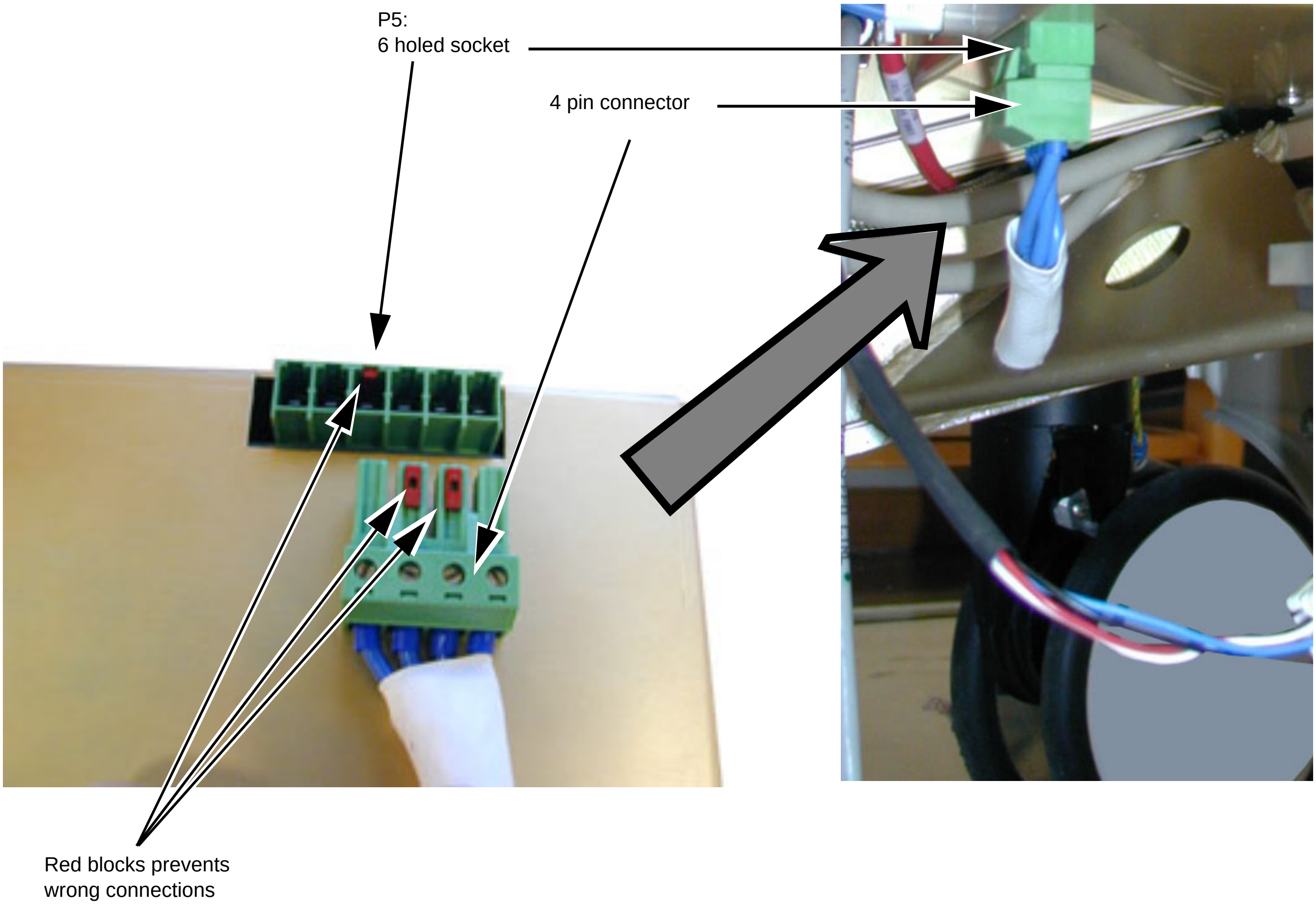


Figure 8-81 Input Voltage connector/socket

8-11-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-12
DC Power Replacement Procedure

8-12-1 Manpower

One person, 30 minutes

8-12-2 Tools

4 mm blade screwdriver.

DANGER **Dangerous voltages are present in this equipment. Completely power off and shut down the scanner before servicing.**

8-12-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Remove Right Side Cover, see "Side Covers Removal Procedure" on page 8-4.
3.) Remove the Front End’s Cover.
    a.) Turn seven (7) quarter-turn screws to loosen Front-End door.
    b.) Holding the door, lift it out of its retainers along the lower edge of Front-End.

8-12-4 DC Power Removal Procedure

1.) Unscrew three (3) screws as shown in Figure 8-82.
2.) Unplug PCI cable from the socket on IMP2 board.
3.) Pull the DC Power a little to get access to power cables.
4.) Remove retaining clasp and unplug Power Cable and HV Cable.
5.) Remove DC Power.

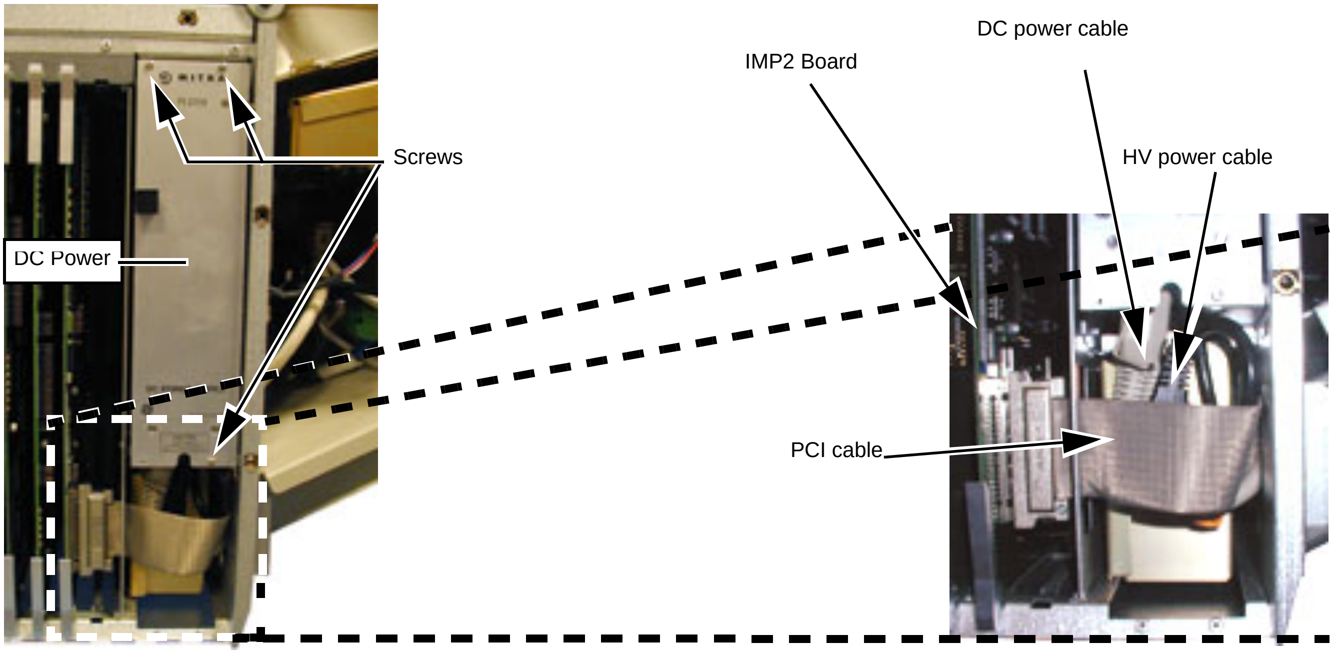

DC power cable
IMP2 Board
Screws
HV power cable
DC Power
PCI cable

Figure 8-82 DC Power and Cabling.

8-12-5 DC Power Installation Procedure

1.) Slide DC Power module into its guides.
2.) Plug in HV cable and Power cable and secure Power cable with the retaining clasp.
3.) Push DC Power module gently in position.
4.) Fasten three (3) screws.
5.) Connect PCI cable to IMP2 Board or RFI Board.
6.) Install Front-End Cover.
7.) Install Right Side Cover, see "Side Covers Installation Procedure" on page 8-5.
8.) Do functional check-out, see chapter 4.

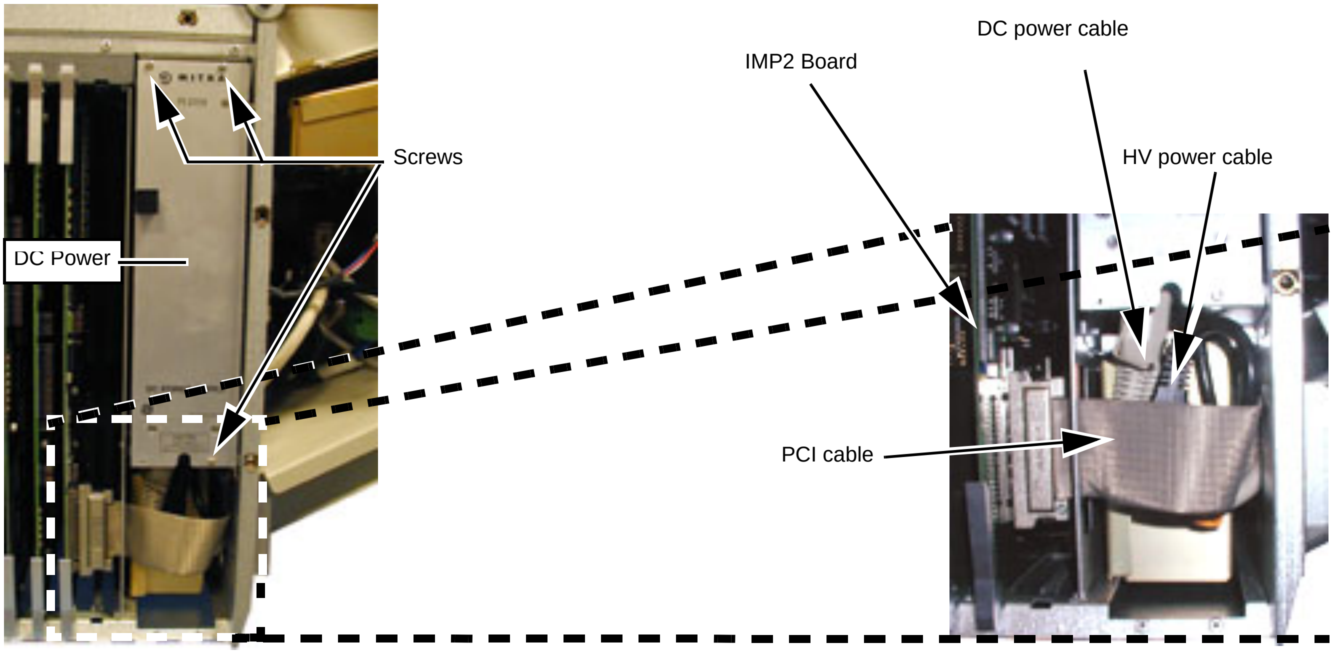


Figure 8-83 DC Power and Cabling.

8-12-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-13
TX Power Replacement Procedure

8-13-1 Manpower

One person, 30 minutes

8-13-2 Tools

- Phillips screwdriver 2
- 4 mm blade screwdriver

⚠ DANGER **Dangerous voltages are present in this equipment. Completely power off and shut down the scanner before servicing.**

8-13-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.

2.) Remove Right Side Cover, see "Side Covers Removal Procedure" on page 8-4.

3.) Remove the Front-End Door.

  a.) Turn seven (7) quarter-turn screws to loosen Front-End door.

  b.) Holding the door, lift it out of its retainers along the lower edge of Front-End.

4.) Disconnect PCI cable from IMP2 Board shown in Figure 8-84.

.

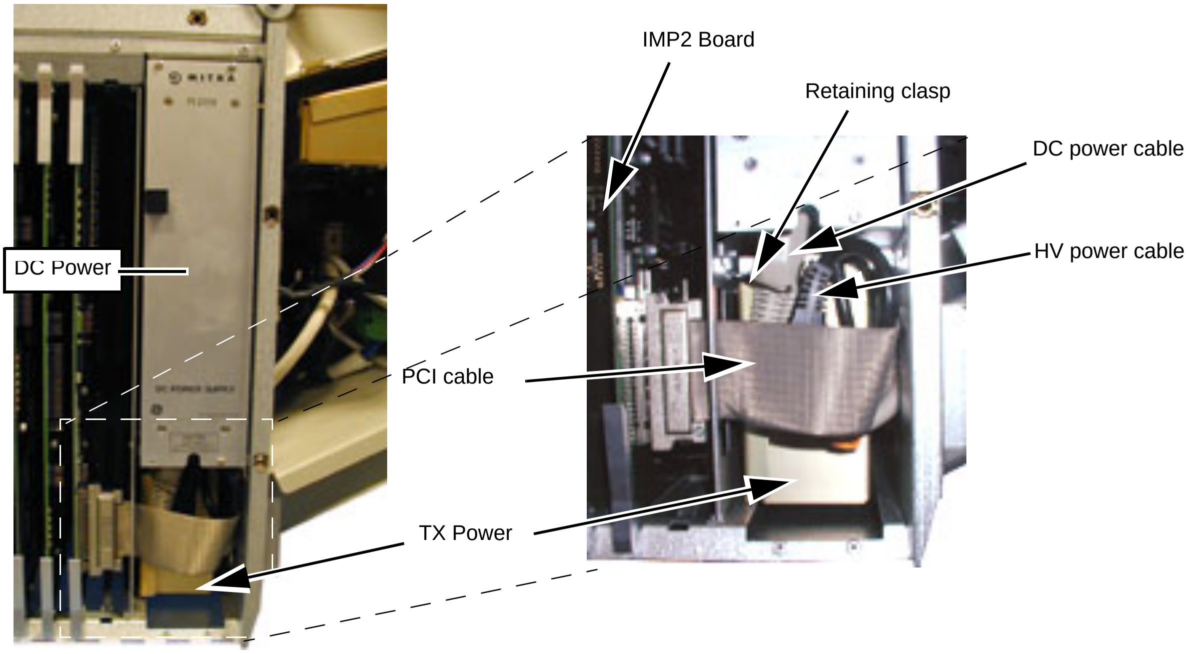


Figure 8-84 DC Power, TX Power and Cabling.

8-13-4 TX Power Removal Procedure

1.) Remove retaining clasp from DC Power connector.
2.) Unplug DC Power and TX Power.
3.) Unscrew two (2) screws in front of TX Power.

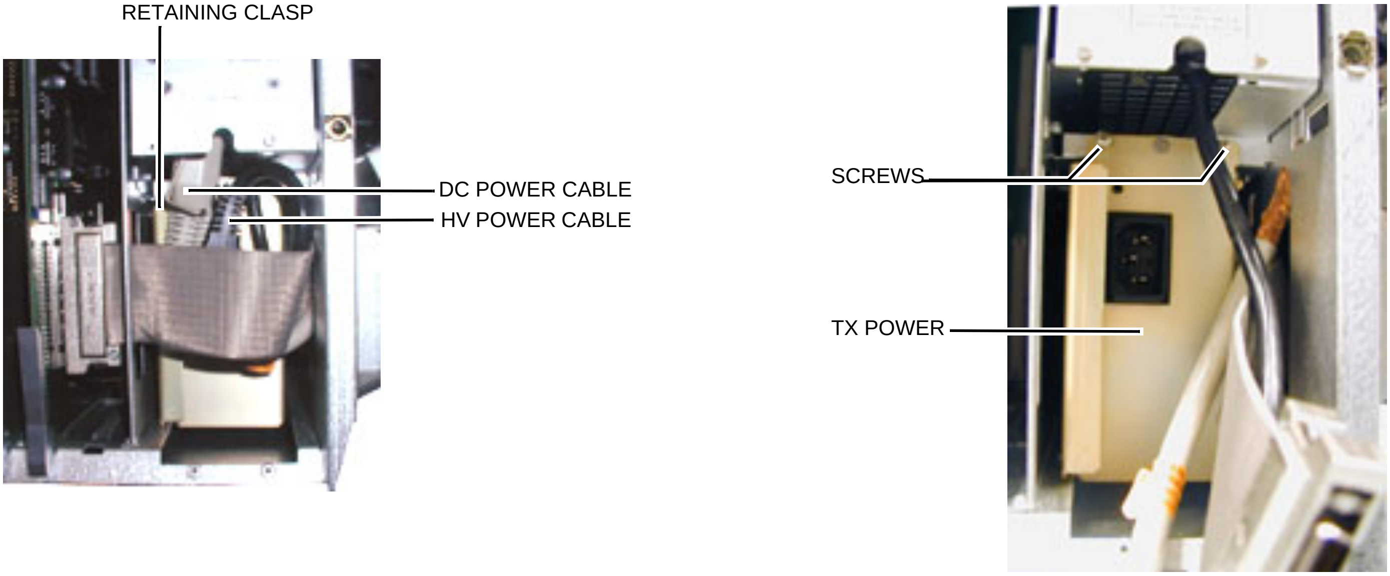


Figure 8-85 DC Power, TX Power and Cabling.

4.) Push cables aside and pull out TX Power from its socket.

8-13-5 TX Power Installation Procedure

1.) Push cables aside and install TX Power.
2.) Fasten two (2) screws.
3.) Connect DC Power Cable and secure the connector with retaining clasp.
4.) Connect HV Power Cable (TX Power Cable)
5.) Connect PCI cable to IMP2 Board.
6.) Install Right Side Cover, see "Side Covers Removal Procedure" on page 8-4.
7.) Install Front-End Cover.

Section 8-14
Rear Casters Replacement Procedure

8-14-1 Manpower

2 persons, 30 minutes (one Caster)

8-14-2 Tools

- Phillips screwdriver size 2
- 5 mm hexagon key
- Bevel Edged Board and Wooden Wedge (service parts, see Table 9-77 "Service Kits, Overview" on page 9-99.)

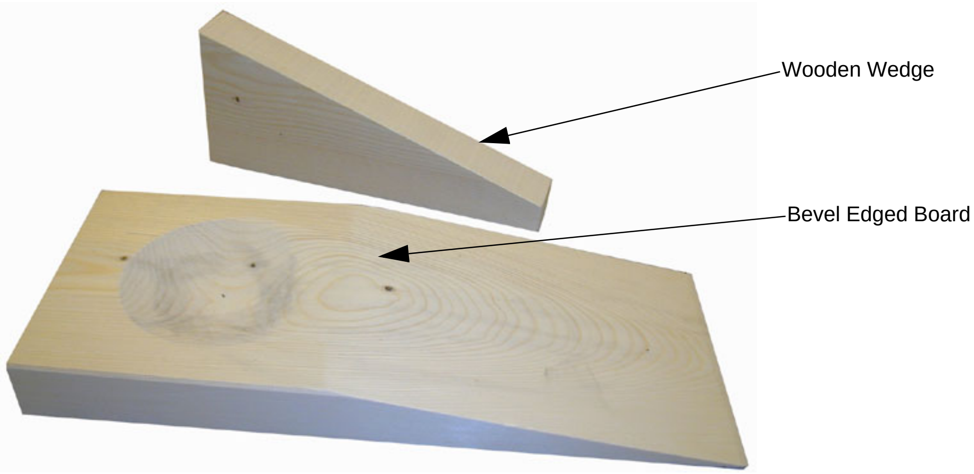


Figure 8-86 Bevel Edged Board and Wooden Wedge.

8-14-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Remove the Side Covers, see "Side Covers Removal Procedure" on page 8-4.
3.) Remove Filter Cover, see "Upper Rear Cover Removal Procedure" on page 8-6.
4.) Remove Lower Rear Cover, see "Lower Rear Cover Removal Procedure" on page 8-10.

8-14-4 Rear Casters Removal Procedure

1.) Turn Front Casters as shown in Figure 8-87.
2.) Activate Direction Lock.
3.) Put the bevel-edged board on the floor.

⚠ **WARNING** ***Prior to elevating scanner, verify that the floating Operator Panel is locked in its lowest position.***

⚠ **WARNING** ***Use extreme caution as long as VIVID 7 is un-stable, not resting on all four Casters.***

4.) Pull the system backwards up the board incline. This will lift the Rear Wheel on the opposite side of the System from the floor.

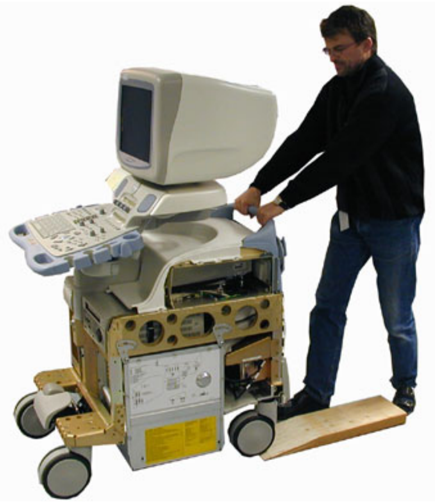


Figure 8-87 Pull system backwards up the board incline

8-14-4 Rear Casters Removal Procedure (cont'd)

5.) Activate the brakes on all Casters, except the one you intend to replace.

6.) Turn the Rear Caster that stands on the Bevel Edged Board in the direction as shown in Figure 8-88.

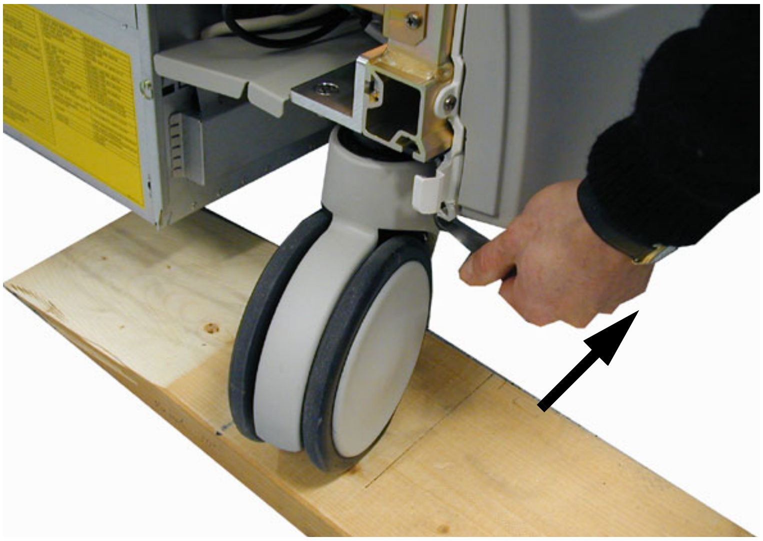


Figure 8-88 Activate Rear Brakes

7.) The system is now nearly balanced between one Front and one Rear Caster (illustrated in this Procedure; Left Front and Right Rear).

8.) Make the System rest on both Front Casters and lift the Rear Caster. Put the Wooden Wedge under the AC Transformer. This will stabilize the System with the Rear Caster free from the floor.

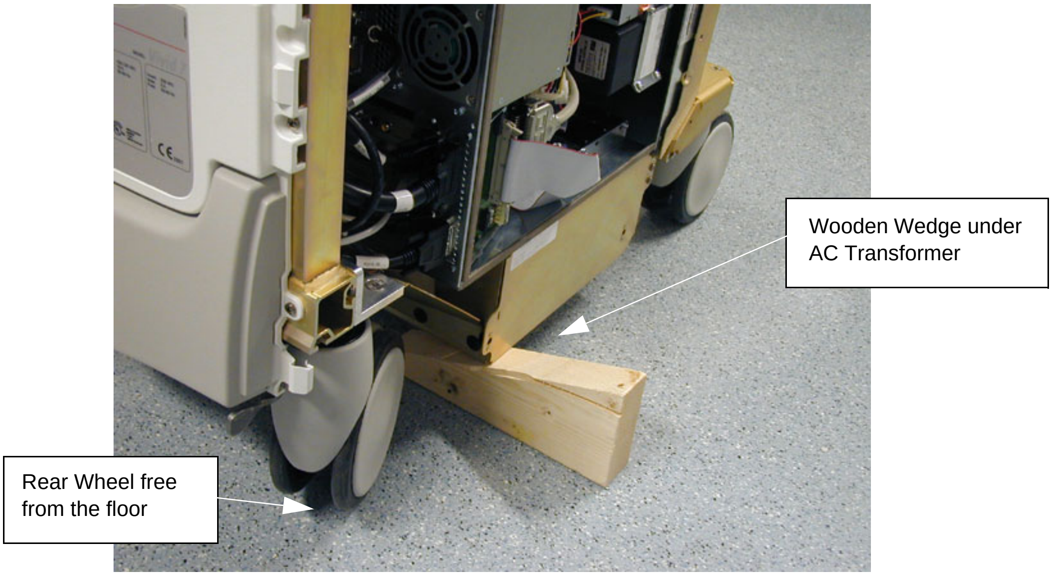

Wooden Wedge under AC Transformer
Rear Wheel free from the floor

Figure 8-89 System stabilized with Rear Caster free from the floor

8-14-4 Rear Casters Removal Procedure (cont'd)

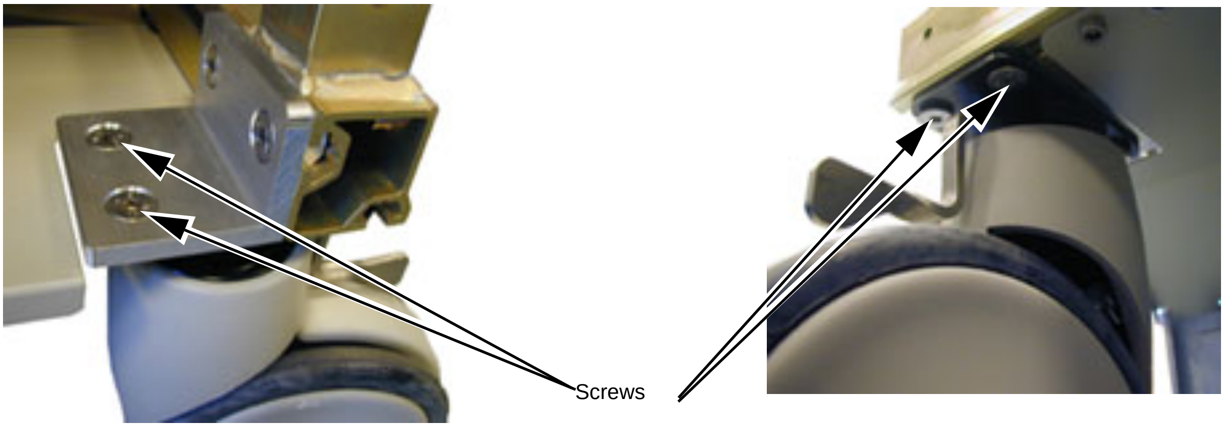


Figure 8-90 Rear Caster fastening

9.) Remove four (4x) screws fastening Caster.

10.) Remove Caster

8-14-5 Rear Casters Installation Procedure

1.) Replace the Caster and tightly fasten it with four (4x) screws.

WARNING ***Use extreme caution in the next two steps. The scanner is unstable.***

2.) Remove the Wooden Wedge.

3.) Roll the system off the Bevel Edged Board.

4.) To replace the other Rear Caster, repeat all the steps from "Rear Casters Removal Procedure" on page 8-92, but now using the Bevel Edged board and the Wooden Wedge on the other side of the system.

5.) Install Lower Rear Cover, see "Lower Rear Cover Installation Procedure" on page 8-10.

6.) Install Filter Cover, see "Upper Rear Cover Installation Procedure" on page 8-6.

7.) Install Side Covers, see "Side Covers Installation Procedure" on page 8-5.

Section 8-15
Front Casters Replacement Procedure

8-15-1 Manpower

1 persons, 30 minutes per Caster

8-15-2 Tools

- Torx screwdriver T-20
- Open end wrenches, 10 mm and 134 mm
- 5 mm hexagon key
- Bevel Edged Board and Wooden Wedge (service parts, see Table 9-77 "Service Kits, Overview" on page 9-99.)

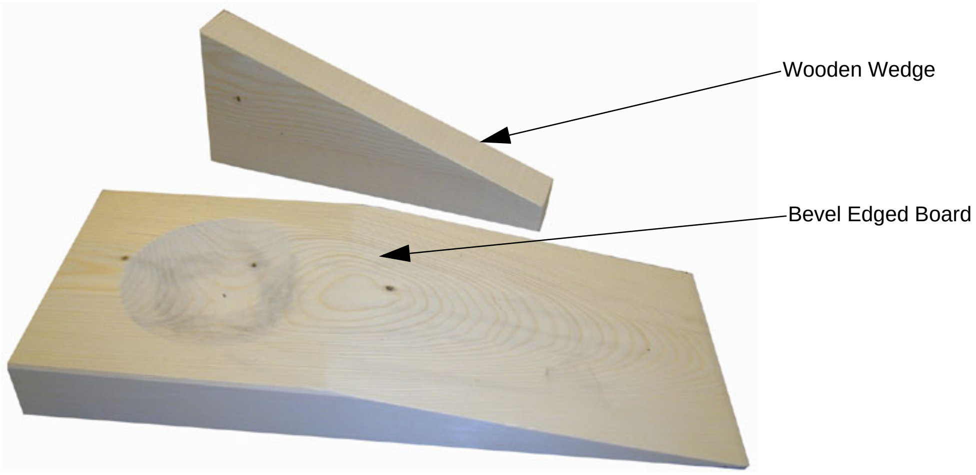


Figure 8-91 Bevel Edged Board and Wooden Wedge.

8-15-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Remove the Front Bumper, see "Front Bumper Removal Procedure" on page 8-100.
3.) Turn Front Casters as shown in Figure 8-92.
4.) Activate Direction Lock.
5.) Put the Bevel Edged Board on the floor.

8-15-4 Front Casters Removal Procedure

WARNING ***Prior to elevating scanner, verify that the floating Operator Panel is locked in its lowest position.***

WARNING ***Use extreme caution as long as VIVID 7 is un-stable, not resting on all four Casters.***

6.) Pull the system backwards up the board incline.

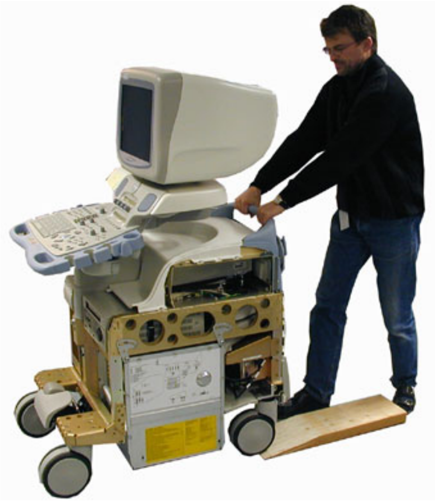


Figure 8-92 Pull system backwards up the board incline

7.) Turn the Rear Caster on the board in the direction as shown in Figure 8-93.

8.) Activate both Rear Brakes as shown in Figure 8-93.

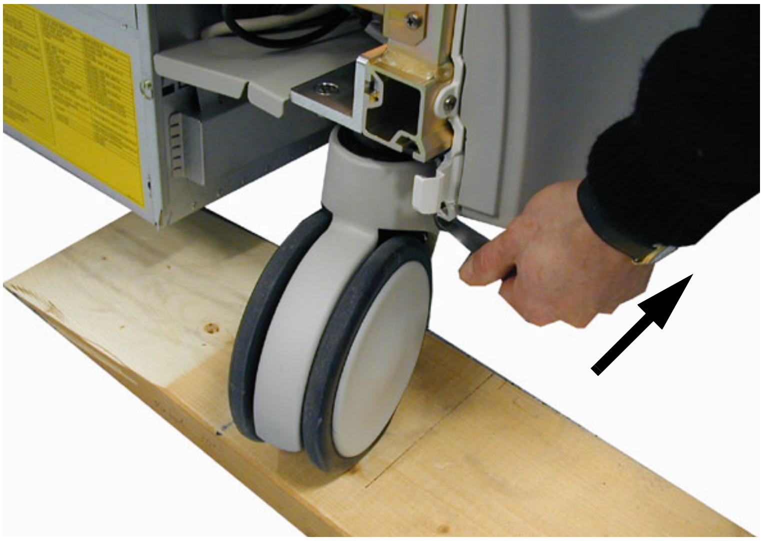


Figure 8-93 Activate both rear brakes

8-15-4 Front Casters Removal Procedure (cont'd)

9.) Put the Wooden Wedge under the Front-End Card Cage. This will stabilize the System with the right Front Wheel free from the floor.

.

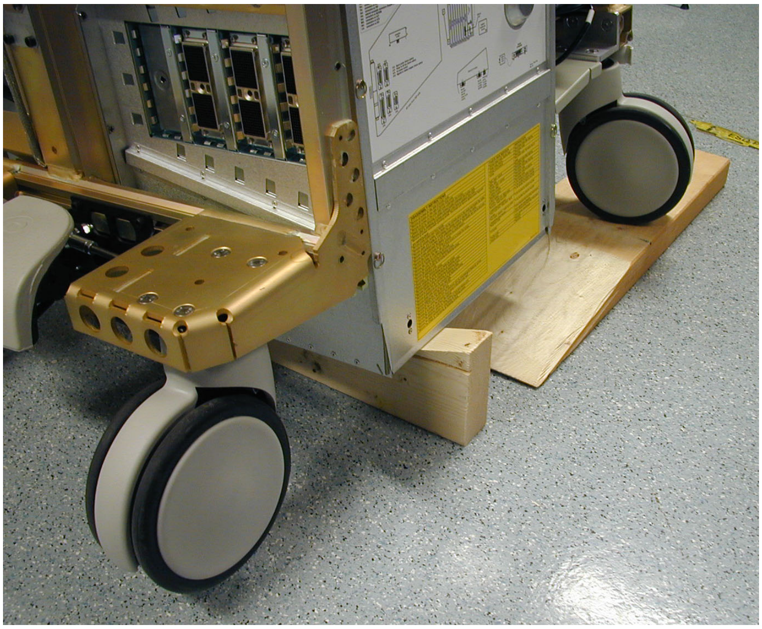


Figure 8-94 System stabilized with front wheel free from the floor

8-15-4 Front Casters Removal Procedure (cont'd)

10.) Remove the lock pin that secures the ball joint.

11.) Pull balljoint apart.

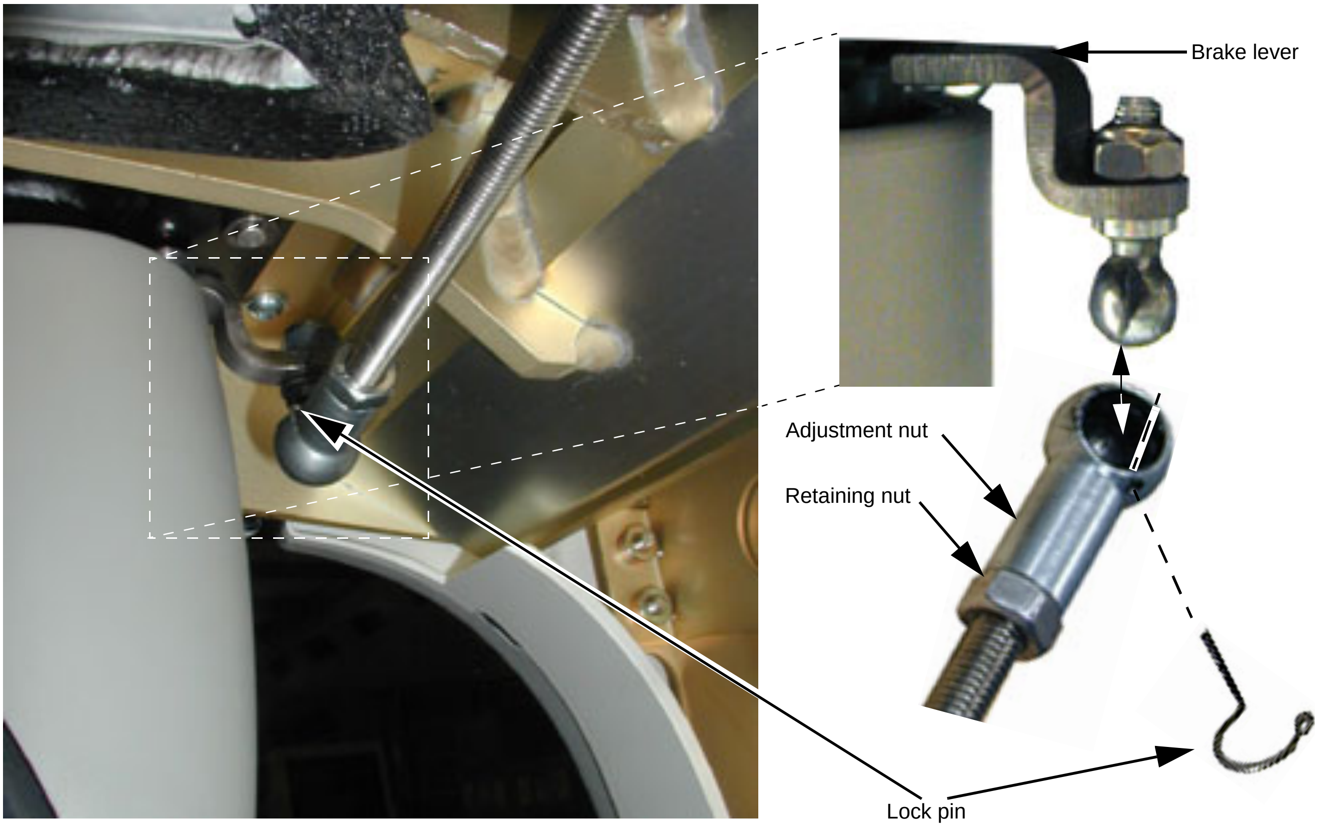

Brake lever
Adjustment nut
Retaining nut
Lock pin

Figure 8-95 Front Caster Brake Arm and Ball Joint Parts

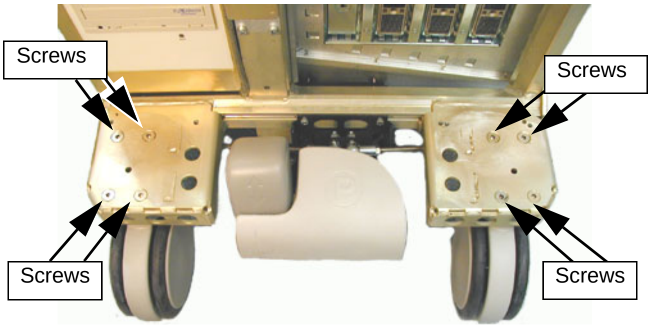

Screws
Screws
Screws
Screws

Figure 8-96 Caster fastening (both Casters shown)

12.) Unscrew four (4x) screws.

13.) Remove the Caster.

8-15-5 Front Casters Installation Procedure

1.) Move the ball piece of the joint from old Caster to new Caster (See Figure 8-95).

2.) Align new Caster on the frame and fasten it tightly with four (4x) hexagon screws.

3.) Press the ball joint together and install the lock pin (See Figure 8-95).

4.) To replace the other Front Caster, repeat all the steps from "Front Casters Removal Procedure" on page 8-96, but now using the Bevel Edged board and the Wooden Wedge on the other side of the system.

5.) Install Bumper and Covers, see "Front Bumper Installation Procedure" on page 8-100.

6.) Roll the system off the Bevel Edged Board.

Section 8-16
Front Bumper Replacement Procedure

8-16-1 Manpower

One person, 30 minutes

8-16-2 Tools

- Phillips size 2
- Torx screwdriver T-20

8-16-3 Preparations

1.) Shut down the system, see 4-2-3 "Power Shut Down" on page 4-7.
2.) Remove Front Cover, see "Front Cover Removal Procedure" on page 8-7.

8-16-4 Front Bumper Removal Procedure

1.) Unscrew 4 Torx screws under the bumper.

2.) Lift the bumper off.

8-16-5 Front Bumper Installation Procedure

1.) Put the new bumper in position.

2.) Fasten the 4 screws firmly.

NOTE: Do NOT overtighten these screws.

3.) Install Front Cover, see "Front Cover Installation Procedure" on page 8-7.

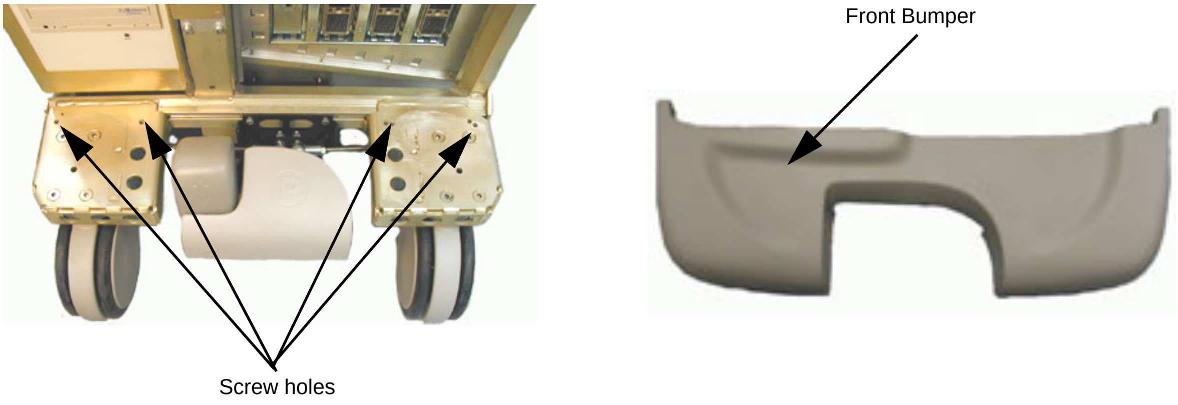


Figure 8-97 System front and Front Bumper

Section 8-17
Brake Pedal Replacement Procedure

8-17-1 Manpower

One person, 15 minutes + travel

8-17-2 Tools

Torx screwdriver T-20

8-17-3 Brake Pedal Replacement Procedure

1.) Unscrew the four screws under the pedal.
2.) Replace the pedal with a new one.
3.) Fasten the four screws.

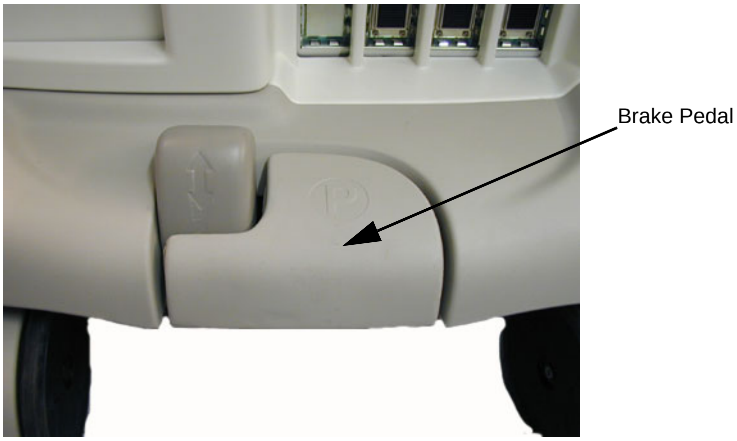


Figure 8-98 Brake Pedal

Section 8-18
Direction Lock Pedal Replacement Procedure

8-18-1 Manpower

One person, 15 minutes

8-18-2 Tools

Torx screwdriver T-20

8-18-3 Direction Lock Replacement Procedure

1.) Unscrew 4 screws, 3 under and 1 at the left side of the pedal.
2.) Replace the pedal with a new one.
3.) Fasten 4 screws.

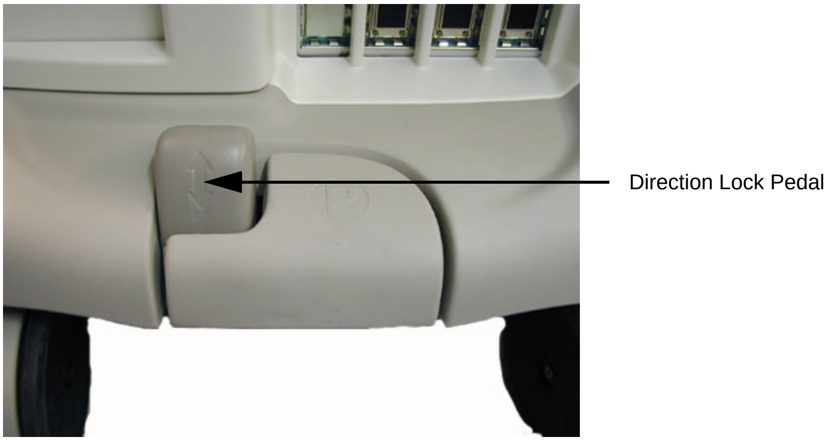


Figure 8-99 Direction Lock Pedal

Section 8-19
Brake Pedal and Direction Lock Assembly Replacement Procedures

8-19-1 Manpower

One person, 1 hour

8-19-2 Tools

- Phillips screwdriver size 2
- Hexagon key 5 mm
- Torx screwdriver T-20
- Wrench 11 and 13 mm

8-19-3 Preparations

1.) Remove Front Bumper, see "Front Bumper Removal Procedure" on page 8-100.

2.) Remove footrests on both pedals by unscrewing 4 Torx screws on each.

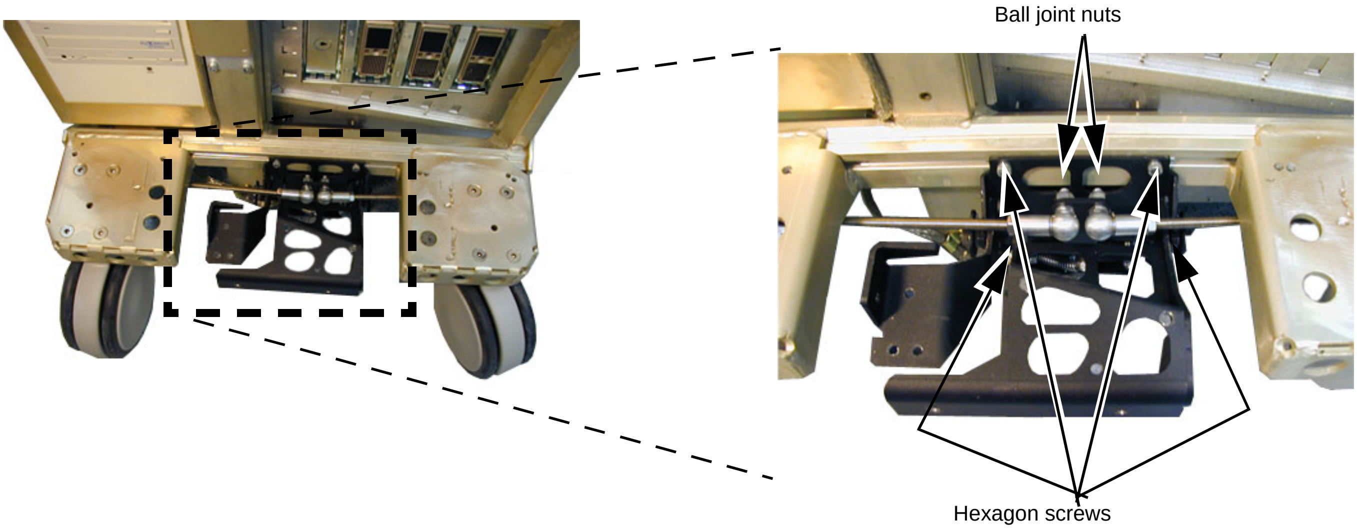


Figure 8-100 Brake Assembly

8-19-4 Brake Pedal and Direction Lock Removal Procedure

1.) Unscrew 2 nuts on the two ball joints on the brake rods, located over the middle of brake assembly. Wrench 11 and 13.

2.) Unscrew the 4 hexagon screws. Two of them located under the Brake Assembly.

NOTE: The nuts may slide out of position.

3.) Remove the Brake Pedal and Direction Lock Assembly.

8-19-5 Brake Pedal and Direction Lock Installation Procedure

1.) Put the Brake Pedal and Direction Lock Assembly in position and fasten the 4 hexagon screws loosely in the sliding nuts.
2.) Fasten the ball joint nuts before tightening the 4 hexagon screws.
3.) Install Front Bumper, see "Front Bumper Installation Procedure" on page 8-100.
4.) Fasten footrests to Brake Pedal and Direction Lock Assembly. Fasten the screws gently.

8-19-6 Verification - Functional Checks

- Please perform the tests specified in Section 8-20 "Verification - Functional Checks" on page 8-105.

Section 8-20
Verification - Functional Checks

8-20-1 Functional Checks and Tests

The following table lists the required Functional Tests, based upon the FRU being replaced.

Table 8-22 Functional Test Matrix sheet 1 of 3

Section	FRU Replacement	Diagnostics	Leakage Current	Functional Test
	Basic Functional Checks			3-6-6-1 "Connect Mains Power to the Unit" on page 3-23 4-2-2 "Power ON/ Boot UP" on page 4-3 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-7 "M Mode Checks" on page 4-39 4-3-8 "Color Mode Checks" on page 4-43 4-3-9 "Doppler Mode Checks" on page 4-49 4-3-11 "Tissue Velocity Imaging (TVI) Checks" on page 4-57 4-3-12 "Contrast Checks" on page 4-63 4-3-13 "Stress Echo" on page 4-63 4-3-14 "Measurements and Multi Image Checks" on page 4-64 4-3-15 "Multi Image Checks" on page 4-66 4-3-18 "Cineloop Check" on page 4-69 3-6-5-2 "Disconnect Probe" on page 3-22 4-2-3 "Power Shut Down" on page 4-7
8-2	"Side Covers (with Bumpers) Replacement Procedure" on page 8-4			4-2-2 "Power ON/ Boot UP" on page 4-3 4-2-3 "Power Shut Down" on page 4-7 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80
8-3	"Upper Rear Cover (Filter Cover) Replacement Procedure" on page 8-6			4-2-2 "Power ON/ Boot UP" on page 4-3 4-2-3 "Power Shut Down" on page 4-7 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80
8-4	"Front Cover Replacement Procedure" on page 8-7			4-2-2 "Power ON/ Boot UP" on page 4-3 4-2-3 "Power Shut Down" on page 4-7 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80
8-5	"Air Filter Replacement Procedure" on page 8-8			4-2-2 "Power ON/ Boot UP" on page 4-3 4-2-3 "Power Shut Down" on page 4-7 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80

Table 8-22 Functional Test Matrix (cont'd) sheet 2 of 3

Section	FRU Replacement	Diagnostics	Leakage Current	Functional Test
8-6	"Lower Rear Cover Replacements Procedure" on page 8-10			4-2-2 "Power ON/ Boot UP" on page 4-3 4-2-3 "Power Shut Down" on page 4-7 3-6-5-1 "Connect a Probe" on page 3-21 4-3-5 "Performance Tests" on page 4-31 4-3-6 "2D Mode (B mode) Checks" on page 4-32 4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80
8-7	"Software Loading Procedure - Software Version v7.x, v6.x, v5.x and v4.x" on page 8-12			4-4-1 "Software Configuration Checks" on page 4-82 Perform "Basic Functional Checks" on page 8-105 3-7-1-4 "Language Selection" on page 3-30 3-7-1-5 "Online Manual Language Selection" on page 3-31
8-8	"Software Loading Procedure - Software Version v3.x" on page 8-38			4-4-1 "Software Configuration Checks" on page 4-82 Perform "Basic Functional Checks" on page 8-105 3-7-1-4 "Language Selection" on page 3-30 3-7-1-5 "Online Manual Language Selection" on page 3-31
8-9	"Software Loading Procedure - Software Version v2.x" on page 8-54			4-4-1 "Software Configuration Checks" on page 4-82 Perform "Basic Functional Checks" on page 8-105 3-7-1-4 "Language Selection" on page 3-30 3-7-1-5 "Online Manual Language Selection" on page 3-31
8-11	"AC Power Replacement Procedure" on page 8-82		10-7-4 10-7-5 10-7-6 10-7-7 10-7-8 10-7-9	Perform "Basic Functional Checks" on page 8-105 10-7-4 "Grounding Continuity" on page 10-14 10-7-5 "Chassis Leakage Current Test" on page 10-16 10-7-6 "Isolated Patient Lead (Source) Leakage–Lead to Ground" on page 10-17 10-7-7 "Isolated Patient Lead (Source) Leakage–Lead to Lead" on page 10-18 10-7-8 "Isolated Patient Lead (Sink) Leakage-Isolation Test" on page 10-19 10-7-9 "Probe Leakage Current Test" on page 10-21
8-12	"DC Power Replacement Procedure" on page 8-86		10-7-4 10-7-5 10-7-6 10-7-7 10-7-8 10-7-9	Perform "Basic Functional Checks" on page 8-105 10-7-4 "Grounding Continuity" on page 10-14 10-7-5 "Chassis Leakage Current Test" on page 10-16 10-7-6 "Isolated Patient Lead (Source) Leakage–Lead to Ground" on page 10-17 10-7-7 "Isolated Patient Lead (Source) Leakage–Lead to Lead" on page 10-18 10-7-8 "Isolated Patient Lead (Sink) Leakage-Isolation Test" on page 10-19 10-7-9 "Probe Leakage Current Test" on page 10-21
8-13	"TX Power Replacement Procedure" on page 8-89		10-7-4 10-7-5 10-7-6 10-7-7 10-7-8 10-7-9	Perform "Basic Functional Checks" on page 8-105 10-7-4 "Grounding Continuity" on page 10-14 10-7-5 "Chassis Leakage Current Test" on page 10-16 10-7-6 "Isolated Patient Lead (Source) Leakage–Lead to Ground" on page 10-17 10-7-7 "Isolated Patient Lead (Source) Leakage–Lead to Lead" on page 10-18 10-7-8 "Isolated Patient Lead (Sink) Leakage-Isolation Test" on page 10-19 10-7-9 "Probe Leakage Current Test" on page 10-21

Table 8-22 Functional Test Matrix (cont'd) sheet 3 of 3

Section	FRU Replacement	Diagnostics	Leakage Current	Functional Test
8-14	"Rear Casters Replacement Procedure" on page 8-91			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105
8-15	"Front Casters Replacement Procedure" on page 8-95			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105
8-16	"Front Bumper Replacement Procedure" on page 8-100			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105
8-17	"Brake Pedal Replacement Procedure" on page 8-101			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105
8-18	"Direction Lock Pedal Replacement Procedure" on page 8-102			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105
8-19	"Brake Pedal and Direction Lock Assembly Replacement Procedures" on page 8-103			4-3-21-3 "Brakes and Direction Lock Checks" on page 4-80 Perform "Basic Functional Checks" on page 8-105

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Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of Spare Parts for Vivid 7.

9-1-2 Contents in Chapter 9

Table 9-1 Contents in Chapter 9

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Section 9-2
Definitions of Left, Right, Front and Back

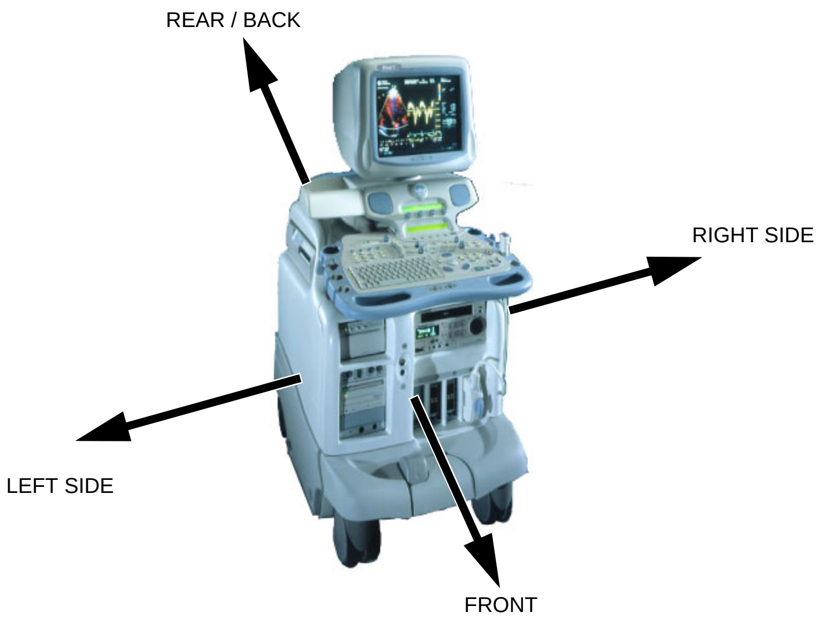

Figure 9-1 Definition of Left, Right, Front and Back of Vivid 7

Section 9-3
List of Abbreviations

Table 9-2 List of Abbreviations

ABBREVIATIONS	DESCRIPTION
3D	THREE DIMENSIONAL (SEE RT3D and 4D)
4D	4 Dimensional is the same as RT3D. 3D view in real time. The time is the 4th dimension.
ACP	AC CONTROLLER (AC POWER)
ACT	AC TRANSFORMER
ASSY	ASSEMBLY
BEP	BACK-END PROCESSOR
CTRL	CONTROL
EXT.	EXTERNAL
F.O.B.	FLOCK OF BIRDS—FOR 3D OPTION **NOTE:** “FLOCK OF BIRDS” IS NOT USED ON THE Vivid 7 SCANNER
FEP	FRONT-END PROCESSOR
FRU Y	REPLACEMENT PART
FRU N	NON STOCK PART
I/O	INPUT/OUTPUT
INT	INTERNAL
LCD	LIQUID CRYSTAL DISPLAY
OP	OPERATOR PANEL
PC	PERSONAL COMPUTER (BACK-END PROCESSOR)
PS	POWER SUPPLY
PWA	PRINTED WIRE ASSEMBLY
QTY	QUANTITY USED PER SCANNER
RT3D	REAL TIME THREE DIMENSIONAL (OPTION TO Vivid 7–INTRODUCED 2004) Same as 4D.
RX	RECEIVER
TX	TRANSMITTER
XFRMR	TRANSFORMER

Section 9-4
Parts List Groups

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Section 9-5
Vivid 7 Models and Hardware/Software Compatibility

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MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FD000010	VIVID 7 DIMENSION CONSOLE, LCD MONITOR, 230 VAC	FEP2 (RFI)	BEP4.2	v7.0
FD000020	VIVID 7 DIMENSION CONSOLE, LCD MONITOR, 100-120 VAC			
FD000120	VIVID 7 PRO CONSOLE, LCD MONITOR, 230 VAC			
FD000130	VIVID 7 PRO CONSOLE, LCD MONITOR, 100-120 VAC			
FD000140	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR, 230 VAC			
FD000150	VIVID 7 DIM. W/ MULTI-DIM. & VOLUME, LCD MONITOR, 100-120 VAC			
FD000160	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR, 230 VAC			
FD000170	VIVID 7 DIM. W/ MULTI-DIM. IMAGING, LCD MONITOR, 100-120 VAC			
FD000180	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR, 230 VAC			
FD000190	VIVID 7 DIM. W/ VOLUME ULTRASOUND, LCD MONITOR,100-120 VAC			
FC000890	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 230 VAC	FEP2 (RFI)	BEP4.2	v6.x
FC000900	VIVID 7 DIMENSION MULTIDIMENSIONAL & Volume (BT'06) 120 VAC			
FC000910	VIVID 7 DIMENSION (BT'06) 230 VAC			
FC000920	VIVID 7 DIMENSION (BT'06) 100-120 VAC			
FC000930	VIVID 7 PRO (BT'06) 230 VAC			
FC000940	VIVID 7 PRO (BT'06) 100-120 VAC			
FC000950	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 230 VAC			
FC000960	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'06) 120 VAC			
FC000970	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 230 VAC			
FC000980	VIVID 7 DIMENSION VOLUME ULTRASOUND (BT'06) 120 VAC			

Table 9-4 Vivid 7 Models and Hardware/Software Compatibility (cont'd) sheet 2 of 3

MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FC000760	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME (BT'05), 230 VAC	FEP2 (RFI)	BEP3.2	v5.x
FC000770	VIVID 7 DIMENSION, MULTIDIMENSIONAL RENDERING AND VOLUME (BT'05), 120 VAC			
FC000780	VIVID 7 DIMENSION (BT'05), 230 VAC			
FC000790	VIVID 7 DIMENSION (BT'05), 100-120 VAC			
FC000800	VIVID 7 PRO (BT'05), 230 VAC			
FC000810	VIVID 7 PRO (BT'05), 100-120 VAC			
FC000820	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'05), 230 VAC			
FC000830	VIVID 7 DIMENSION MULTIDIMENSIONAL IMAGING (BT'05), 120 VAC			
FC000840	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05), 230 VAC			
FC000850	VIVID 7 DIMENSION w/ VOLUME ULTRASOUND (BT'05), 100-120 VAC			
FC000699	VIVID 7 (BT'04), 100-120 VAC	FEP2 (RFI)	BEP3	v4.x
FC000660	VIVID 7 PRO (BT'04), 100-120 VAC			
FC000650	VIVID 7 PRO (BT'04), 230 VAC			
FC000640	VIVID 7 DIMENSION (BT'04), 100-120 VAC			
FC000630	VIVID 7 DIMENSION (BT'04), 230 VAC			
FC000620	VIVID 7 DIMENSION WITH 3D (BT'04), 100-120 VAC			
FC000610	VIVID 7 DIMENSION WITH 3D (BT'04), 230 VAC			
FC000440	VIVID 7 PRO with RFI, 100-120 VAC		BEP2.2	v3.2/v3.4
FC000430	VIVID 7 PRO with RFI, 230 VAC			
FC000420	VIVID 7 with RFI, 100-120 VAC			
FC000410	VIVID 7 with RFI, 230 VAC			

Table 9-4 Vivid 7 Models and Hardware/Software Compatibility (cont’d) sheet 3 of 3

MODEL NUMBER	DESCRIPTION	FRONT-END PROCESSOR	BACK-END PROCESSOR	APPLICATION SOFTWARE VERSION(S)
FC000340	VIVID 7 PRO (BT’03), 100 - 120 VAC	FEP1 (RFT)	BEP2	v3.1/v3.3
FC000330	VIVID 7 PRO (BT’03), 220 - 240 VAC			
FC000320	VIVID 7 (BT’03), 100 - 120 VAC			
FC000310	VIVID 7 (BT’03), 220 - 240 VAC			
FC000210	VIVID 7 (BT’02), 100 - 120 VAC		- Manufactured with either BEP1 or BEP2. - BEP2 may be used as FRU - BEP2 phased into production from September 2002.	v2.3/v2.4
FC000200	VIVID 7 (BT’02), 220 - 240 VAC			
FC000190	VIVID 7 PRO (BT’02), 100 - 120 VAC			
FC000180	VIVID 7 PRO (BT’02), 220 - 240 VAC			
FC000060	VIVID 7 (BT’01), 100 - 120 VAC		- Manufactured with BEP1 - BEP2 may be used as FRU	
FC000030	VIVID 7 (BT’01), 230 VAC			

Section 9-6
Software

9-6-1 Software Version v7.x (BT'08)

Table 9-5 Software used on BT'08 (Software Version v7.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7 with BEP4.3, SYSTEM SW CD	FD200078	System Software installation CD, v3.0 (Ghost CD)	1	Y
2	VIVID 7 with BEP4.2, SYSTEM SW CD	FC200824	FOR UPGRADED SYSTEMS: System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (08.OCT.07): v.2.1.1	1	Y
3	VIVID 7 with BEP3.x, SYSTEM SW CD	FC200565	FOR UPGRADED SYSTEMS: System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (08.OCT.07): v.2.1.1	1	Y
APPLICATION SOFTWARE					
4	VIVID 7 AND ECHOPAC PC APPLICATION SOFTWARE V7.x.x	FD200110	Application Software Installation CD, Disk 2 of 2, v7.x.x	1	Y

9-6-2 Software Version v6.x

Table 9-6 Software used on BT'06 (Software Version v6.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7 with BEP4.2, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (08OCT07): v.2.1.1	1	Y
2	VIVID 7 with BEP3.x, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (08OCT07): v.2.1.1	1	Y
APPLICATION SOFTWARE					
3	APPLICATION CD	FC200885	Application Software Installation CD, Disk 2 of 2, v6.x.xLatest application software version (08OCT07): v.6.1.3	1	Y
4	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v6.1.x (THIS CD ALSO INCLUDE SOFTWARE v4.2.x and v5.2.x)Latest application software version (08OCT07): v.v.6.1.3	1	Y
SOFTWARE PATCHES					
5	Apps sw v.6.1.1x patch	FD200032	NOISE REDUCTION IN CW DOPPLER	1	N
6	CANADIAN MULTILINGUAL KEYBOARD LAYOUT	FC200938		1	Y

9-6-3 Software Version v5.x

Table 9-7 Software used on BT'05 (Software Version v5.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7 with BEP4.x, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v.2.0.8	1	Y
2	VIVID 7 with BEP3.x, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v.2.0.6	1	Y
APPLICATION SOFTWARE					
3	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v5.2.x (THIS CD ALSO INCLUDE SOFTWARE v4.2.x and v6.1.x)Latest application software version (16AUG07): v.5.2.0	1	Y
SOFTWARE PATCHES					
6	CANADIAN MULTILINGUAL KEYBOARD LAYOUT	FC200938		1	Y

9-6-4 Software Version v4.x

Table 9-8 Software used on BT'04 (Software Version v4.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7 with BEP4.2, SYSTEM SW CD	FC200824	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v.2.0.8	1	Y
2	VIVID 7 with BEP3, SYSTEM SW CD	FC200565	System Software installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v.2.0.6	1	Y
APPLICATION SOFTWARE					
3	APPLICATION SOFTWARE	FC200979	APPLICATION SOFTWARE v4.2.x (THIS CD ALSO INCLUDE SOFTWARE v5.2.x and v6.1.x)Latest application software version (16AUG07): v.4.2.0.	1	Y
4	APPLICATION CD	FC200569	Application Software Installation CD, Disk 2 of 2 Software v4.2.x Latest application software version (16AUG07): v.4.2.0.	1	Y
SOFTWARE PATCHES					
6	CANADIAN MULTILINGUAL KEYBOARD LAYOUT	FC200938		1	1

9-6-5 Software Version v3.x

Table 9-9 Software used on BT'03 (Software Version v3.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7, SYSTEM SW CD, BEP4	FD200035	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) (FOR USE ON BOTH RFT AND RFI SYSTEMS WITH BEP4) Latest system software version (16AUG07): v1.5.2	1	Y
2	VIVID 7 with RFI, SYSTEM SW CD, BEP2.2	FC200564	Vivid 7/Vivid 7 PRO with RFI, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	N
3	VIVID 7, SYSTEM SW CD, BEP2	FC200564	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	N
4	VIVID 7, SYSTEM SW CD, BEP1	FC200563	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	Y
APPLICATION SOFTWARE					
5a	APPLICATION CD, BEP2.2 (Vivid 7 w/ RFI)	FC200568	V7 RFI Application SW Installation CD, Disk 2 of 2 Latest application software version (16AUG07): v3.6.0 Patch to v3.6.2 is available, se below.	1	Y
7	APPLICATION SW version 3.x.x	FC200567	V7 RFT APPLICATION SOFTWARE VERSION 3.x.x Latest application software version (16AUG07): v3.5.0. Patch to v3.5.1 is available, se below.	1	Y
SOFTWARE PATCHES					
8	VIVID 7 PC2IP3 PATCH FOR BEP4	FD200034		1	Y
9	DOPPLER FIRMWARE UPGRADE	FC200562	PATCH	1	N
10	SONY CRX230E SOFTWARE DRIVER PATCH	FC200488	The Sony CRX230E Software Driver is not included on the v1.3.3 or v1.4.0 System Software ghost CD.	1	Y
11	Software version v3.5.1 (Patch)	FD200114	For AppSW 3.5.0 (RFT)	1	Y
12	Software version v3.6.2 (Patch)	FD200116	For AppSW 3.6.0 (RFI)	1	Y

9-6-6 Software Version v2.x

Table 9-10 Software used on BT'02 (Software Version v2.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7, SYSTEM SW CD, BEP4	FD200035	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	Y
2	VIVID 7, SYSTEM SW CD, BEP2	FC200564	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	Y
3	VIVID 7, SYSTEM SW CD, BEP1	FC200563	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.5.2	1	Y
APPLICATION SOFTWARE					
5	APPLICATION CD 2.5.x	FC200566	Application SW Installation CD, Disk 2 of 2 Latest application software version (16AUG07): v2.5.0	1	Y
SOFTWARE PATCHES					
6	VIVID 7 PC2IP3 PATCH FOR BEP4	FD200034		1	Y
7	SONY CRX230E SOFTWARE DRIVER PATCH	FC200488	The Sony CRX230E Software Driver is not included on the v1.3.3 or v1.4.0 System Software ghost CD.	1	Y

9-6-7 Software Version v1.x

NOTE: All BT'01 systems should have been updated to software version v2.x.x by now. The table below is included for history reasons.

Table 9-11 Software used on BT'01 (Software Version v1.x)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
SYSTEM SOFTWARE					
1	VIVID 7, SYSTEM SW CD, BEP2	FC200265	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.3.3	1	N
2	VIVID 7, SYSTEM SW CD, BEP1	FC200165	Vivid 7/Vivid 7 PRO, System SW installation CD, Disk 1 of 2. (Ghost CD) Latest system software version (16AUG07): v1.3.3	1	Y
APPLICATION SOFTWARE					
3	APPLICATION CD	FC200090	Application SW Installation CD, Disk 2 of 2, Latest application software version (16AUG07): v1.2.0	1	Y

9-6-8 Software Patches

Table 9-12 Software Patches

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CD, WINDOWS PATCHES	FC200821-05	REQUIRES SYSTEM SOFTWARE VERSION v1.3.x, v1.4.x, v1.5.0, v1.5.1, v2.0.x. to v2.0.5. WINDOWS PATCHES INCLUDED : MS05-043, MS05-047, MS05-051, MS06-007, MS06-025, MS06-030, MS06-032, MS06-035, MS06-036, MS06-041, MS06-070 REPLACES FC200429	1	Y
2	VULNERABILITY SW CD	FC200429-11	REQUIRES SYSTEM SOFTWARE VERSION V1.3.x, v1.4.x, v1.5.0, v1.5.1, v2.0.x. WINDOWS PATCHES INCLUDED MS05-011, MS05-017, MS05-019, MS05-027, MS05-039, MS05-043, MS05-047, MS05-051	1	Y
3	WINDOWS CYBER SECURITY PATCH CD	FC200939 (Revision 01)	REQUIRES SYSTEM SOFTWARE VERSION v1.3.X, v1.4.X OR v1.5.1 AND APPLICATION SOFTWARE VERSION v3.2.4 OR LOWER. WINDOWS PATCHES INCLUDED: MS03-043, MS03-049, MS04011, MS04-012, MS04-014, FIX FOR MS04-011	1	Y
4	V7 BT06 Patch Collection CD	FC200975	Contents on this CD: FC200969-01 Improved driver for patient I/O with USB2. FC200965-01 Patch for Application Software v6.0.0. FC200964-01 Patch for Application Software v6.0.1. FC200821-04 Patch for BEP4.		
5	VIVID 7, CD OP FIRMWARE V.2.5	FC200963	FIRMWARE FOR OPERATOR PANEL, PART NUMBER FC200680, WITH SOFTWARE VERSION 2.1 AND HIGHER.	1	Y
6	VIVID 7/ECHOPAC PC, LG DVD 4167B DVD SW PATCH	FC200808	TO BE USED WHEN THE DVD DRIVE LG DVD 4167B HAS BEEN INSTALLED AS AN REPLACEMENT FOR A CD DRIVE.	1	Y
7	PATIO USB2 DRIVER	FC200969	REQUIRES SYSTEM SOFTWARE VERSION V2.0.4	1	N
8	Apps sw v.6.1.1x patch	FD200032	NOISE REDUCTION IN CW DOPPLER	1	N
9	VIVID 7 PC2IP3 PATCH FOR BEP4	FD200034	FOR SOFTWARE VERSION V2.X AND V3.X	1	Y

9-6-9 Printer Drivers

Table 9-13 Printer Drivers

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CD, DRIVER FOR UP-D897	FC200959	PRINTER DRIVER FOR INSTALLATION ON Vivid 7 WITH SYSTEM SOFTWARE VERSION V2.0.2 AND EARLIER.	1	Y
2	CD, V7 EP Printer Installer CD	FC200837	GENERIC PRINTER DRIVER SOFTWARE	1	Y

Section 9-7
Plastic Parts, Console, Top and Front

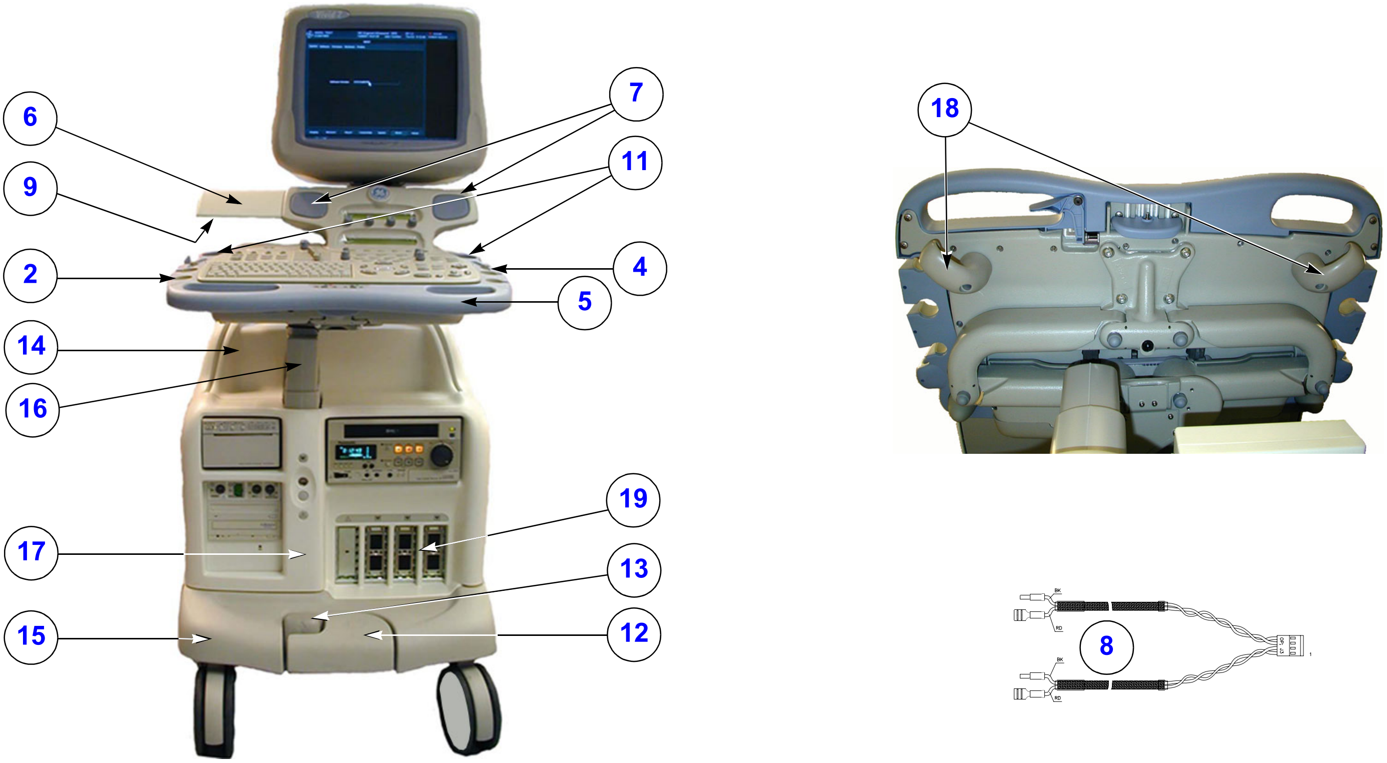
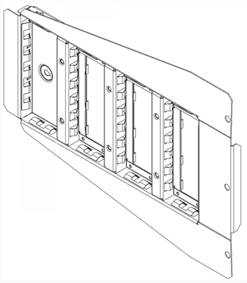


Figure 9-2   Parts, Front of Vivid 7

Table 9-14   Parts, Front of Vivid 7

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
2	PROBEHOLDER, LEFT	FC200596	Probe Holder, Left. mounting 3D REPLACES: FB307293	1	Y
4	PROBEHOLDER, RIGHT	FC200593	Probe Holder, Right Mounting 3D Replaces: FB307294	1	Y
5	HANDLE, MAIN	FC200131	Common Front Handle with Label.	1	Y
6	SHELF	FB307307	Monitor Shelf	1	Y
7	LOUDSPEAKER LEFT & RIGHT ASSY	FB200309	Speaker Assembly	1	Y
8	CABLE, SPEAKERS	FB200852		1	Y
9	COVER, UNDERSHELF	FB307308		1	Y
11	HOLDER, CUP, GEL	FB307313		2	Y
12	BRAKE LOCK PEDAL	FB307407		1	Y

Table 9-14 Parts, Front of Vivid 7 (cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
13	DIRECTIONAL LOCK PEDAL	FB307409	.	1	Y
14	COVER, TOP	FB307383		1	Y
15	BUMPER, FOOTREST	FB307387	FRONT BUMPER	1	Y
16	COLUMN COVERS SET	FC200088		1	Y
17	COVER FRONT WITH BUMPER	FC200076		1	Y
18	PROBE CABLE HOLDER	FC307369	Located below Operator Panel, one on each side. (Introduced June 2003) 	2	Y
19	CONNECTOR PANEL ASSY	FB200460	MOUNTED ON THE RELAY BOARD. 	1	Y

Section 9-8
Plastic Parts, Airduct Cover and Cover Boxes

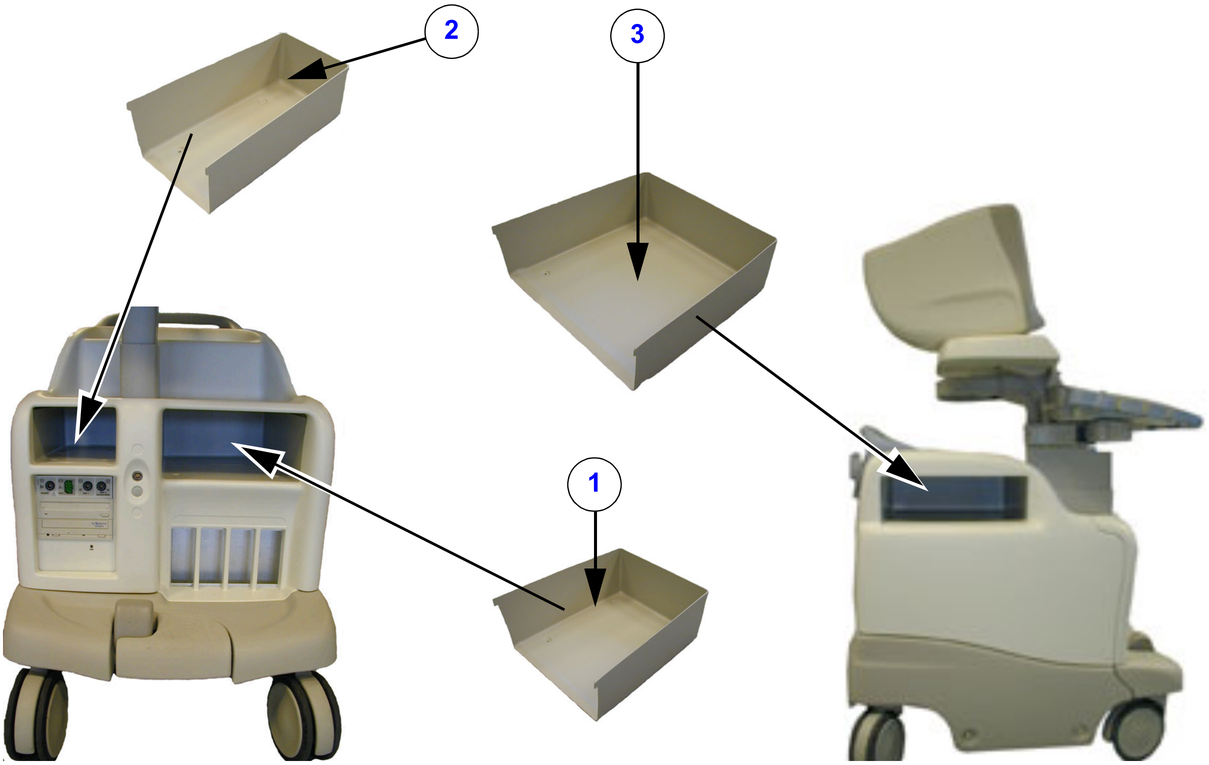


Figure 9-3 Plastic parts, Airduct Cover and Cover boxes

Table 9-15 Plastic Parts, Airduct Cover and Cover Boxes

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	COVER BOX, VCR	FB307988		1	Y
2	COVER, BOX, B/W PRINTER	FB307989		1	Y
3	COVER, BOX, COLORPRINTER	FB307990		1	Y
	HALF COVER BOX		COVER, STORAGE UP21MD (NOT ILLUSTRATED)	1	N
	STORAGE COVER UP21MD	FC307788	COVER, STORAGE UP21MD (NOT ILLUSTRATED)	1	Y

Section 9-9
Plastic Parts, External Covers and Bumpers, Left, Right and Rear

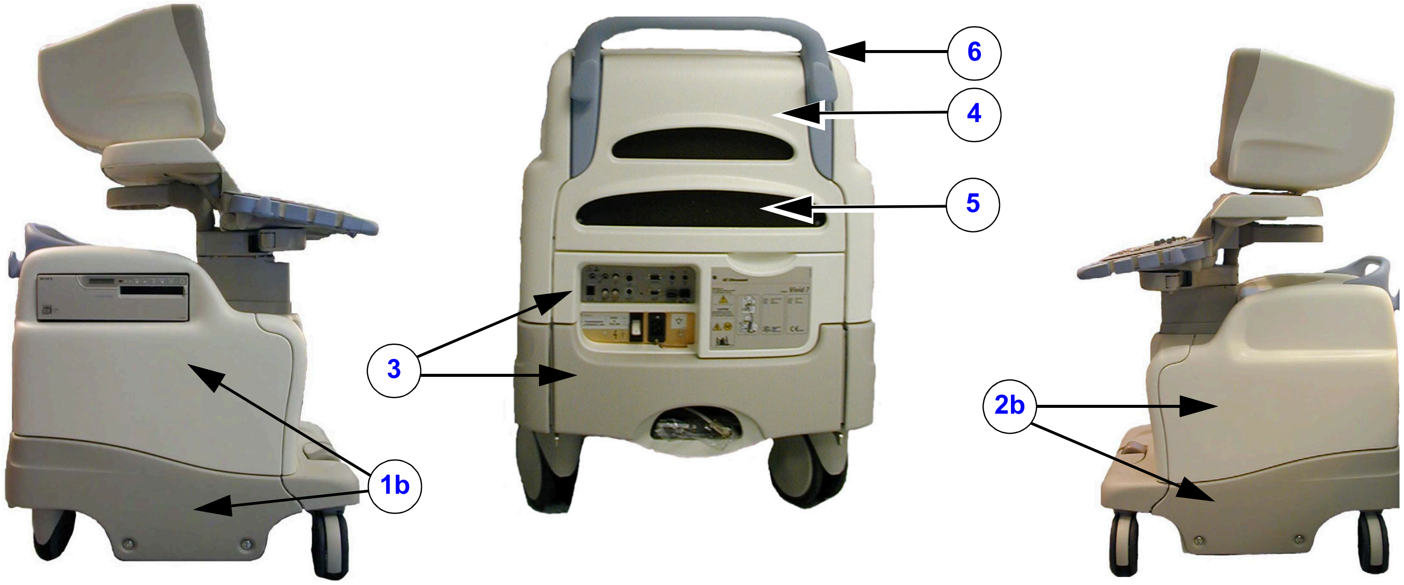


Figure 9-4 Plastic Parts, External Covers and Bumpers, Left, Right and Rear.

Table 9-16 Plastic Parts, External Covers and Bumpers, Left, Right and Rear

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	COVER SIDE LEFT ASSY, WITH LOGO	FC200421		1	Y
2	COVER SIDE RIGHT ASSY, WITH LOGO	FC200422		1	Y
3	COVER REAR WITH BUMPER	FC200077		1	Y
4	COVER, FILTER - WITH MAGNET BRACKETS	FB200385	UPPER REAR COVER (FILTER COVER)	1	Y
5	FILTER, DUST	FB307903	FILTER BLOCK	1	Y
6	HANDLE, REAR	FB307406	WITH CABLE HOOKS	1	Y

Section 9-10
Frogleg and Swivel Arm

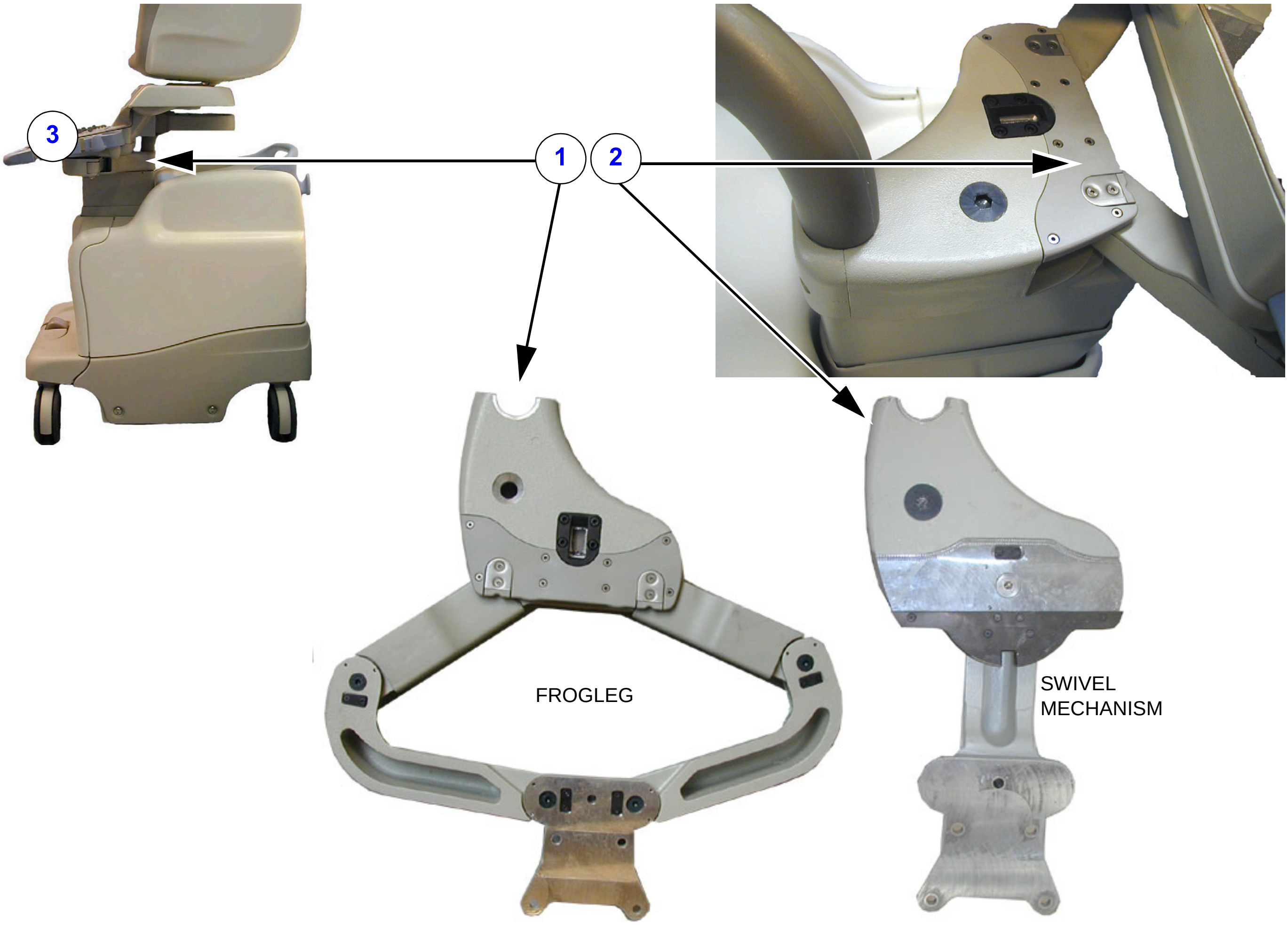


Figure 9-5 Frogleg and Swivel Mechanism Parts

Table 9-17 Frogleg and Swivel Mechanism Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	FROGLEG, COMPLETE	FB200340	For VIVID 7	1	Y
2	SWIVEL MECHANISM ASSEMBLY	FC200150	SWIVEL MECHANISM ASSEMBLY (VIVID 7 PRO)	1	Y
3	TOP CONSOLE V7 PRO	FC200186	For VIVID 7 PRO	1	Y

Section 9-11
Console Lock

9-11-1 Introduction

The Console Lock Mechanism on VIVID 7 PRO is different from the other VIVID 7 models.

This section includes:

- 9-11-2 "Console Lock - VIVID 7/VIVID 7 Dimension" on page 9-23
- 9-11-3 "Console Lock - Vivid 7 PRO" on page 9-24

9-11-2 Console Lock - VIVID 7/VIVID 7 Dimension

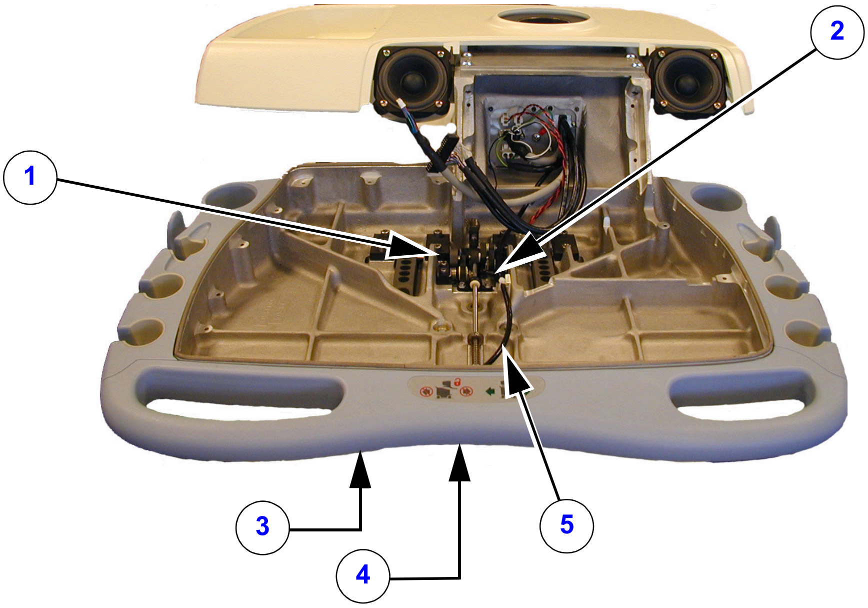


Figure 9-6 Top Console Lock - VIVID 7/VIVID 7 Dimension

Table 9-18 Top Console Lock - VIVID 7/VIVID 7 Dimension

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	COMMON TOP CONSOLE LOCK ASSY	FB200350	Not used on V7 PRO.	1	Y
2	RELEASE LOCK	FB200920	Not used on V7 PRO.	1	Y
3	HANDLE, Z-RELEASE	FB307296		1	Y
4	HANDLE	FB307297	XY-RELEASE	1	Y
5	WIRECABLE, GASSPRING	FB307375	Wire used when operating vertical movement of Top Console	1	Y

9-11-3 Console Lock - Vivid 7 PRO

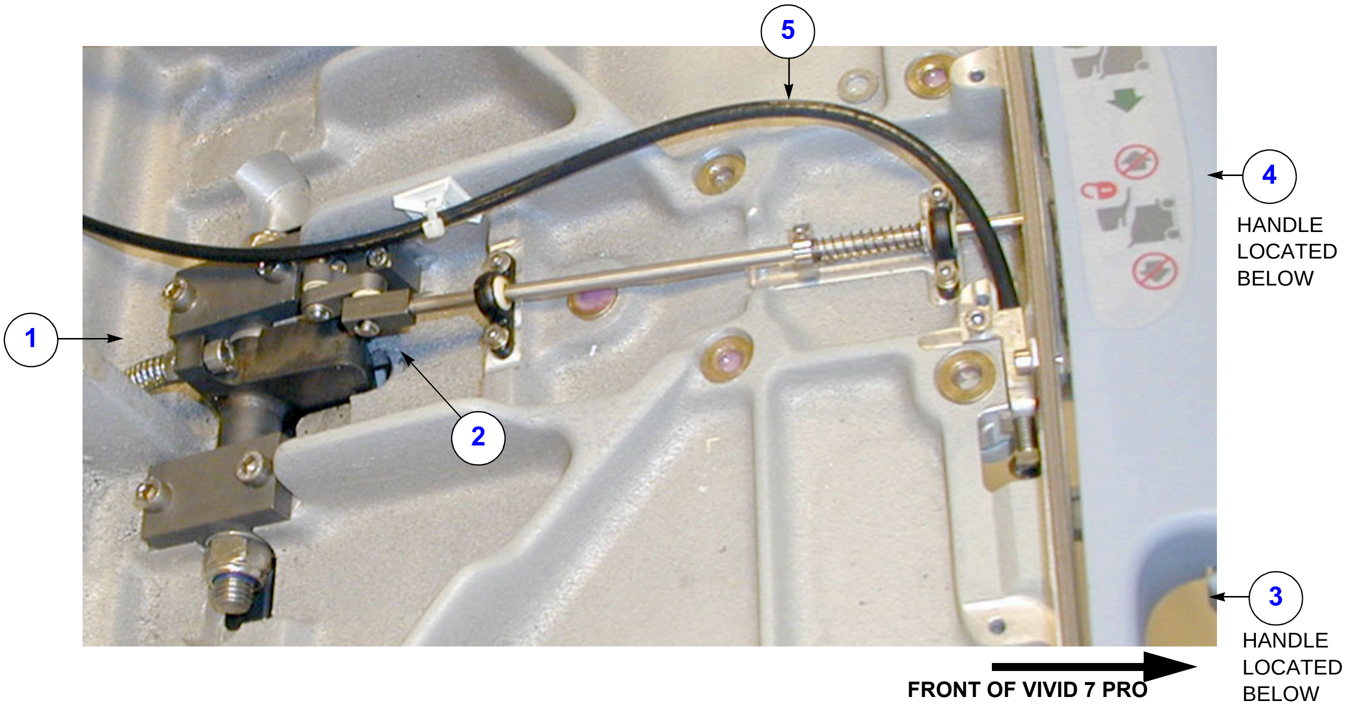

5
4
HANDLE LOCATED BELOW
1
2
3
HANDLE LOCATED BELOW
FRONT OF VIVID 7 PRO

Figure 9-7 Top Console Lock - Vivid 7 PRO

Table 9-19 Top Console Lock - Vivid 7 PRO

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	TOP CONSOLE LOCK ASSY	FB200350		1	Y
2	RELEASE LOCK	FB200920		1	Y
3	HANDLE, Z-RELEASE	FB307296	Up Down movement	1	Y
4	HANDLE	FB307295	Sideways movement	1	Y
5	WIRECABLE	FB307375	Wire used when operating vertical movement of Top Console	1	Y

Section 9-12
Gas Spring

WARNING *WHEN THE TOP CONSOLE IS IN ITS LOCKED POSITION, THE GAS SPRING IS COMPRESSED AND STORES MECHANICAL ENERGY. DURING NORMAL OPERATION THE TOP CONSOLE, THE WEIGHT OF THE MONITOR AND THE MECHANICAL FORCE OF THE GAS SPRING ARE IN BALANCE. TAKE CARE IF/WHEN YOU ACTIVATE THIS GAS SPRING. PERSONAL INJURY CAN OCCUR AFTER THE PANEL IS REMOVED AND THE SPRING PRESSURE IS RELEASED. TAKE CARE WHEN YOU REPAIR THE ELEVATION ASSEMBLY.*

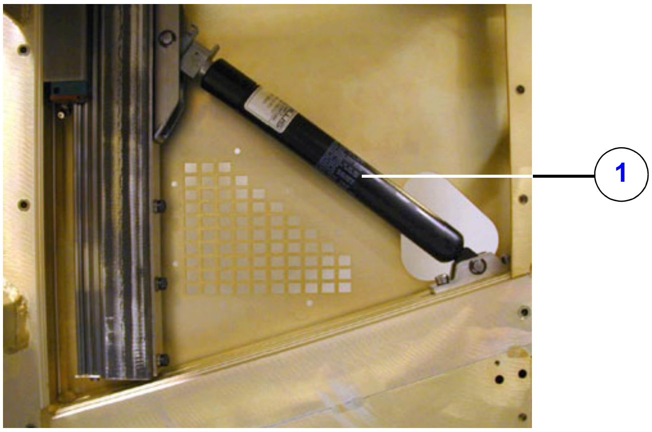


Figure 9-8 Gas Spring (in compressed position)

Table 9-20 Gas Spring

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	GAS SPRING, 670N	5160374	GAS SPRING W/ NUT AND RELEASE Replaces 080X4500 (as FRU) on all Vivid 7. Introduced in manufacturing for Vivid 7 BT06.	1	Y
	GAS SPRING 730N	080X4500	GAS SPRING W/ NUT AND RELEASE	1	Y

Section 9-13
Fan Assembly

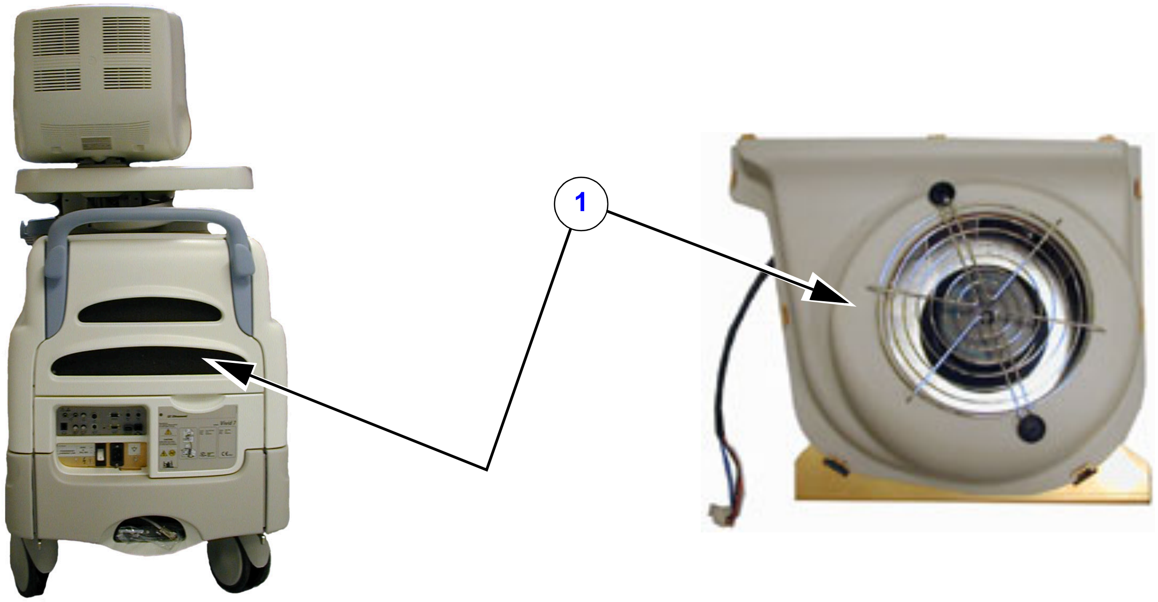


Figure 9-9 Fan Assembly

Table 9-21 Fan Assembly

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	FAN ASSEMBLY COMPLETE	FB200580	FAN ASSEMBLY COMPLETE	1	Y

Section 9-14
Operator Panel

9-14-1 Introduction

Three versions of the Operator Panel have been used;

- Operator Panel–Version 3 (OP–3), see 9-14-2 "Operator Panel–Version 3" on page 9-28
- Operator Panel–Version 2 (OP–2), see 9-14-3 "Operator Panel–Version 2" on page 9-30.
- Operator Panel–Version 1 (OP–1), see 9-14-4 "Operator Panel–Version 1" on page 9-31.
- Common OP electronics (OP–1 and OP–2), see Table 9-25 "OP–1 and OP–2 Common Parts" on page 9-33.

9-14-2 Operator Panel–Version 3

NOTE: Operation Panel, Version 3 (OP–3) was phased into production late 2005 for use on BT'05 and newer systems.

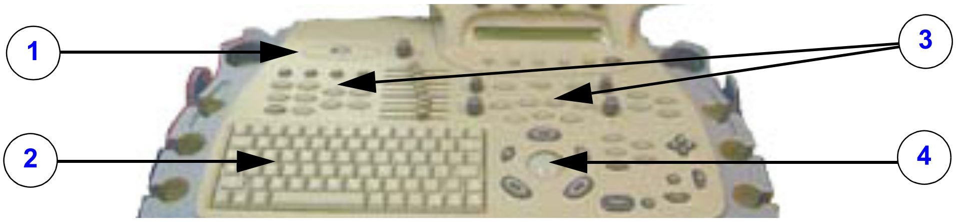


Figure 9-10 Operator Panel Parts

Table 9-22 OP–3 FRU Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	OPERATOR PANEL - ENGLISH	FC200680		1	Y
2	KEY TOPS FOR ALPHANUMERIC KEYBOARD	SEE BELOW		-	-
	UNIVERSAL	066E3101	ENGLISH	1	Y
	FRENCH	066E3102		1	Y
	GERMAN	066E3103		1	Y
	SPANISH	066E3104		1	Y
	ITALIAN	066E3106		1	Y
	SWEDISH	066E3107		1	Y
	NORWEGIAN	066E3108		1	Y
3	KEYTOPS FOR OPERATOR PANEL	SEE BELOW		-	-
	KEYTOPS ENGLISH	066E2201		1	Y
	KEYTOPS FRENCH	066E2202		1	Y
	KEYTOPS GERMAN	066E2203		1	Y
	KEYTOPS SPANISH	066E2204		1	Y
	KEYTOPS PORTUGUESE	066E2205		1	Y
	KEYTOPS ITALIAN	066E2206		1	Y
	KEYTOPS SWEDISH	066E2207		1	Y
	KEYTOPS NORWEGIAN	066E2208		1	Y
4	TRACKBALL	2404652-5		1	Y
	RING-OF-KEYS	FD200113		1	N
	V7 OP MAIN CONTROLLER BOARD VER.2	066E2311		1	Y

Table 9-22 OP–3 FRU Parts (cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
	V7 OP LEFT SWITCH BOARD W/ELASTOMER VER. 2	066E2313		1	Y
	V7 OP RIGHT SWITCH BOARD VER. 2	066E2314		1	Y
	V7 OP LCD MODULE	066E2312		1	Y

9-14-3 Operator Panel–Version 2

NOTE: *Operation Panel, Version 2 (OP–2) was introduced for use on BT'04 systems. It was phased out of production late 2005 and was also used on some BT'05 systems.*

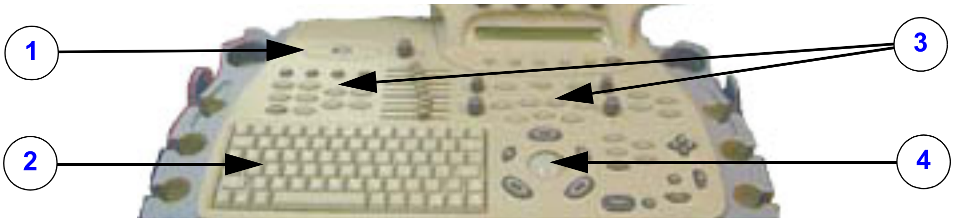


Figure 9-11 Operator Panel Parts

Table 9-23 OP–2 FRU Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	OPERATOR PANEL - ENGLISH	FC200580		1	Y
2	KEY TOPS FOR ALPHANUMERIC KEYBOARD	SEE BELOW		-	-
	UNIVERSAL	066E2101	ENGLISH	1	Y
	FRENCH	066E2102		1	Y
	GERMAN	066E2103		1	Y
	SPANISH	066E2104		1	Y
	ITALIAN	066E2106		1	Y
	SWEDISH	066E2107		1	Y
	NORWEGIAN	066E2108		1	Y
3	KEYTOPS FOR OPERATOR PANEL	SEE BELOW		-	-
	KEYTOPS ENGLISH	066E2201		1	Y
	KEYTOPS FRENCH	066E2202		1	Y
	KEYTOPS GERMAN	066E2203		1	Y
	KEYTOPS SPANISH	066E2204		1	Y
	KEYTOPS PORTUGUESE	066E2205		1	Y
	KEYTOPS ITALIAN	066E2206		1	Y
	KEYTOPS SWEDISH	066E2207		1	Y
	KEYTOPS NORWEGIAN	066E2208		1	Y
4	TRACKBALL	2404652-5		1	Y
	KIT, RING OF KEYS			1	N

9-14-4 Operator Panel–Version 1

NOTE: Operation Panel, Version 1 (OP–1) is only for use on BT'02 and BT'01 systems.

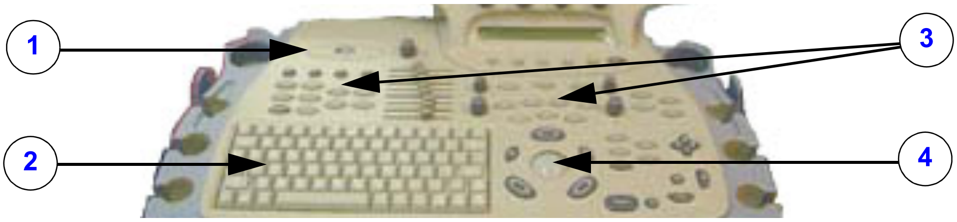


Figure 9-12 Operator Panel Parts

Table 9-24 OP–1 - FRU Parts

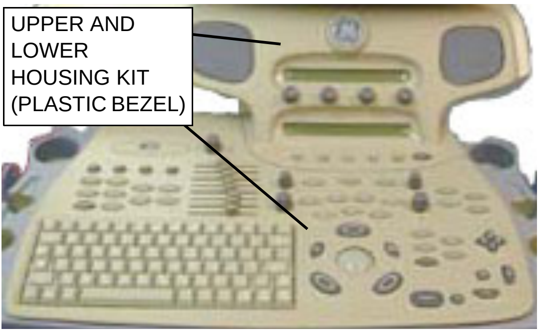
ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	OPERATOR PANEL - ENGLISH	FA200920	For units *without* 3D	1	Y
2	QUERTY KEYBOARD [language]	See Below	ALPHANUMERC KEYBOARD	-	-
	QUERTY KEYBOARD, VIVID 7 UNIVERSAL	066E1101	English	1	Y
	QUERTY KEYBOARD, VIVID 7 FRENCH	066E1102		1	Y
	QUERTY KEYBOARD, VIVID 7 GERMAN	066E1103		1	Y
	QUERTY KEYBOARD, VIVID 7 SWEDISH	066E1107		1	Y
	QUERTY KEYBOARD, VIVID 7 NORWEGIAN	066E1108		1	Y
	QUERTY KEYBOARD, VIVID 7 RUSSIAN	066E1111		1	Y
	QUERTY KEYBOARD, VIVID 7 GREEK	066E1112		1	Y

Table 9-24 OP–1 - FRU Parts (cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
3	KEYTOPS [language] FOR OP-PANEL	See Below		-	-
	KEYTOPS, VIVID 7, ENGLISH	066E1201	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, FRENCH	066E1202	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, GERMAN	066E1203	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, SPANISH	066E1204	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, PORTUG.	066E1205	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, ITALIAN	066E1206	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, SWEDISH	066E1207	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, NORWEG.	066E1208	KEYPADS FOR OP-PANEL	1	Y
	KKEYTOPS, VIVID 7, DANISH	066E1209	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, DUTCH	066E1210	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, RUSSIAN	066E1211	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, GREEK	066E1212	KEYPADS FOR OP-PANEL	1	Y
	KEYTOPS, VIVID 7, TURKISH	066E1213	KEYPADS FOR OP-PANEL	1	Y
4	TRACKBALL	2404652-5		1	Y

9-14-5 Operator Panel–Common Parts

Table 9-25 OP–1 and OP–2 Common Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	V7 OP MAIN CONTROLLER BOARD	066E2301		1	Y
2	V7 OP LCD WITH CONTROLLER BOARD	066E2302		1	Y
3	V7 OP LEFT SWITCH BOARD WITH ELASTOMER	066E2303		1	Y
4	V7 OP RIGHT SWITCH BOARD WITH ELASTOMER	066E2304		1	Y
5	V7 OP TRACKBALL BOARD	066E2305		1	Y
6	V7 OP SINGLE ENCODER	066E2306		1	Y
7	V7 OP UPPER AND LOWER HOUSING KIT	066E2307		1	Y
8	TRACKBALL	2404652-5		1	Y
9	VIVID 7 RING OF KEYS FRU KIT	FC200484	This part is located inside the Operator Panel and is a vital part of the buttons around the trackball	1	Y

Section 9-15
Monitor Assembly

9-15-1 LCD Monitor

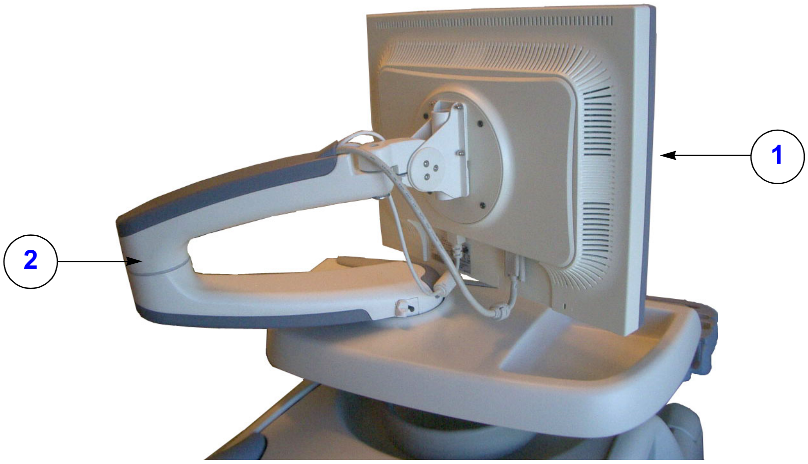


Figure 9-13 LCD Monitor

Table 9-26 LCD Monitor Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	LCD MONITOR ASSEMBLY	FC200936		1	Y
2	LCD 21 SAMSUNG SYNCMASTER 214T	066E3010	21” LCD MONITOR	1	Y
3	BRACKET, LOCK, BASE, F: LCD PWR: CABLE	FC307903	BRACKET, LOCK, BASE, FOR LCD POWER CABLE	1	Y
4	BRACKET, LOCK, CLAMP FLCD PWR. CABLE	FC307904		1	Y
5	VESA ADAPTER PLATE FV7 LCD	FC307906		1	Y
6	LABEL, FRONT BUTTONS	FC314936		1	Y
7	SCREW PAN.HEAD M2.5*5MM	080A205B		1	Y
8	LCD MOUNTING ARM	FC200929		1	Y
9	CABLE, RGB FOR V7 LCD	070D2908		1	Y
10	LCD POWER CABLE	5135957-2		1	Y
11	PLATE, FRAME PEDESTAL, ADD-ON	FC200896		1	Y
12	STEREO GLASSES FOR 3D VISUALIZATION	FD200123	USED TOGETHER WITH THE 4D LV FUNCTION	1	Y

9-15-2 CRT Monitor

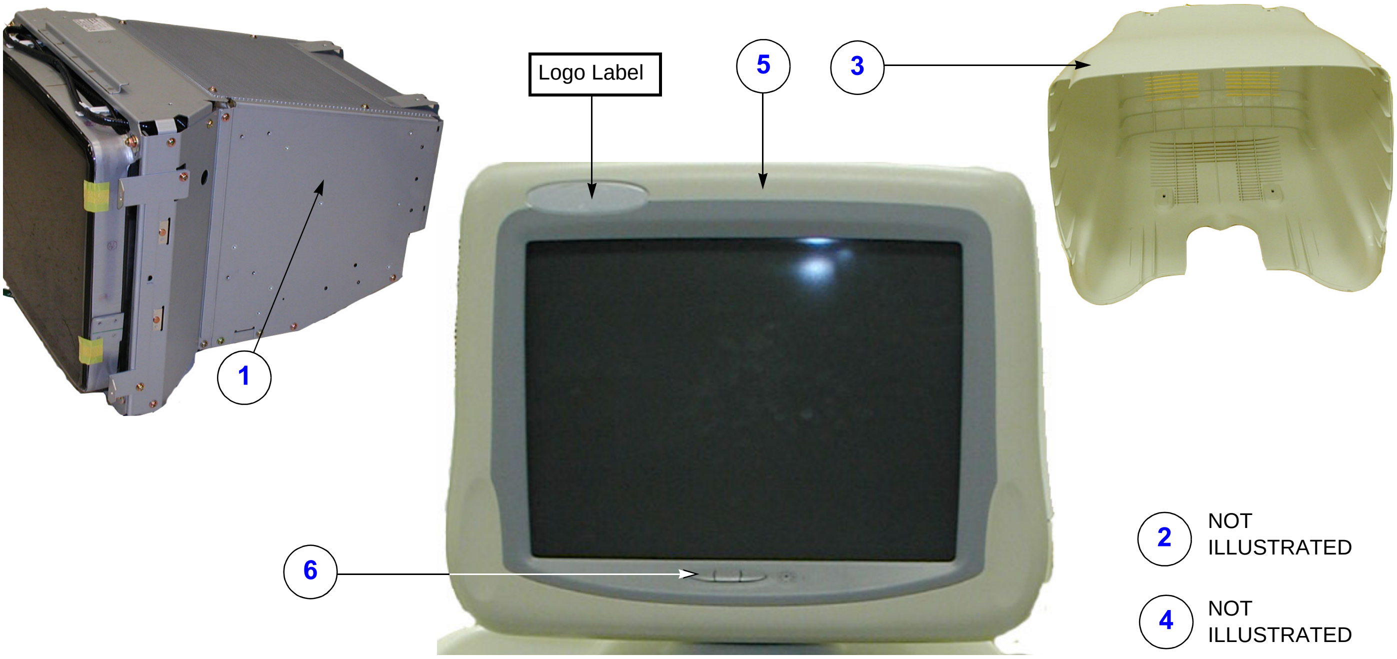


Figure 9-14 CRT Monitor Assembly

Table 9-27 CRT Monitor Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	P9534WA CRT MONITOR ASSY	2283334-4 OR 2283334-5	OPEN FRAME 17" MONITOR	1	Y
2	MON CABLE ASSY	2304171	MONITOR CABLE ASSEMBLY	1	Y
3	P9536AL MON-REAR-NSP-ASSY	2303931	MONITOR REAR COVER ASSEMBLY (WITHOUT SPEAKERS)	1	Y
4	MON CAP ASSY	2303932	MONITOR SCREW CAPS.	2	Y
5	MON FRONT ASSY	2303929	MONITOR FRONT BEZEL ASSEMBLY INCLUDES THREE LOGOS, Vivid 7, LOGIQ 7 and LOGIQ 9. - PLEASE CHOOSE THE APPROPRIATE LABEL AND ATTACH IT TO THE MONITOR FRONT BEZEL. - DISCARD THE OTHER LABELS.	1	Y
6	P9534WK USER SW ASSY OF MONITOR	2297050	MONITOR SWITCH ASSEMBLY	1	Y
	STEREO GLASSES FOR 3D VISUALIZATION	FD200123	USED TOGETHER WITH THE 4D LV FUNCTION	1	Y

Section 9-16
Casters

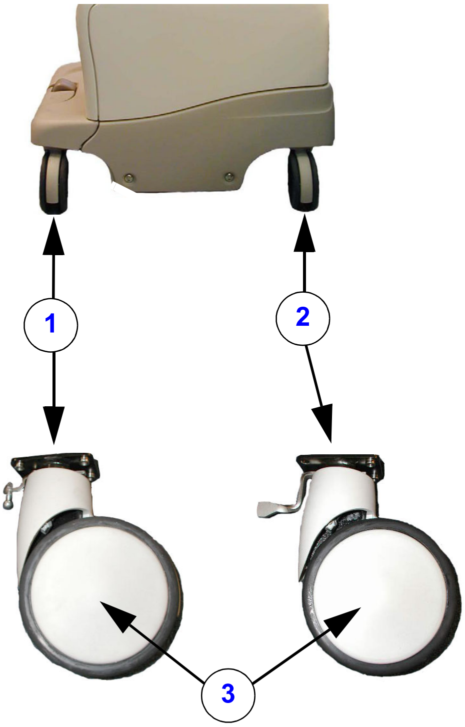


Figure 9-15 Casters

Table 9-28 Casters

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CASTER FRONT	2293008-2	FRONT CASTER WITHOUT SWIVEL LOCK ASSEMBLY.	2	Y
2	CASTER REAR	2293008-3	REAR CASTER WITH SWIVEL LOCK ASSEMBLY.	2	Y
3	CASTER HUB CAPS	2293008-5	Need to order 2 per caster, adhesive mounting	1	Y

Section 9-17
Brake Assembly

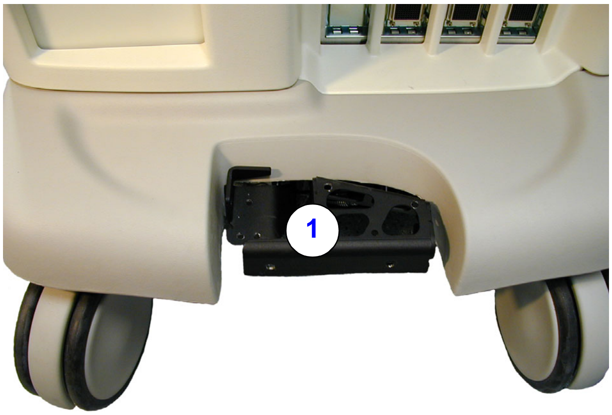
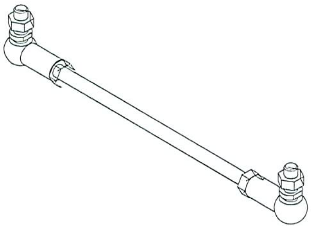
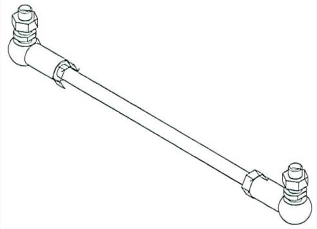


Figure 9-16 Brake Assembly and Console Lock

Table 9-29 Brake Assembly

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	PEDAL ASSEMBLY	FB200595	Brake Pedal Assembly	1	Y
	PEDAL ASSEMBLY	FD200002	Brake Pedal Assembly REPLACEMENT FOR FB200595	1	Y
2	ROD CONNECTION BRAKE LEFT	FB307471		1	Y
3	ROD CONNECTION BRAKE RIGHT	FB307472		1	Y
4	SCREW, PT FASTENER M6 X12MM WN1411	080X0612	PARKING BRAKE PEDAL SCREWS FRONT BUMPER SCREWS		Y

Section 9-18
Front-End Processor Card Cage

9-18-1 Introduction

Two versions of the Front-End Processor have been used;

- Front-End Processor Version 1 (FEP1), see page 9-42.
- Front-End Processor Version 2 (FEP2), see below.

9-18-2 Hardware/Software Versions, Front-End Processor Version 2 (FEP2)

This overview is valid for the following Vivid 7 models:

- BT’03-RFI: FC000410, FC000420, FC000430, FC000440
- BT’04: FC000610, FC000620, FC000630, FC000640, FC000650, FC000660, FC000699
- BT’05: FC000760, FC000770, FC000780, FC000790, FC000800, FC000810, FC000820, FC000830, FC000840, FC000850
- BT’06:FC000890, FC000900, FC000910, FC000920, FC000930, FC000940, FC000950, FC000960, FC000970, FC000980
- BT’08: FD000010, FD000020, FD000120, FD000130, FD000140, FD000150, FD000160, FD000170, FD000180, FD000190

Use Table 9-30 to verify the correct/needed revision on each card in the FEP2.

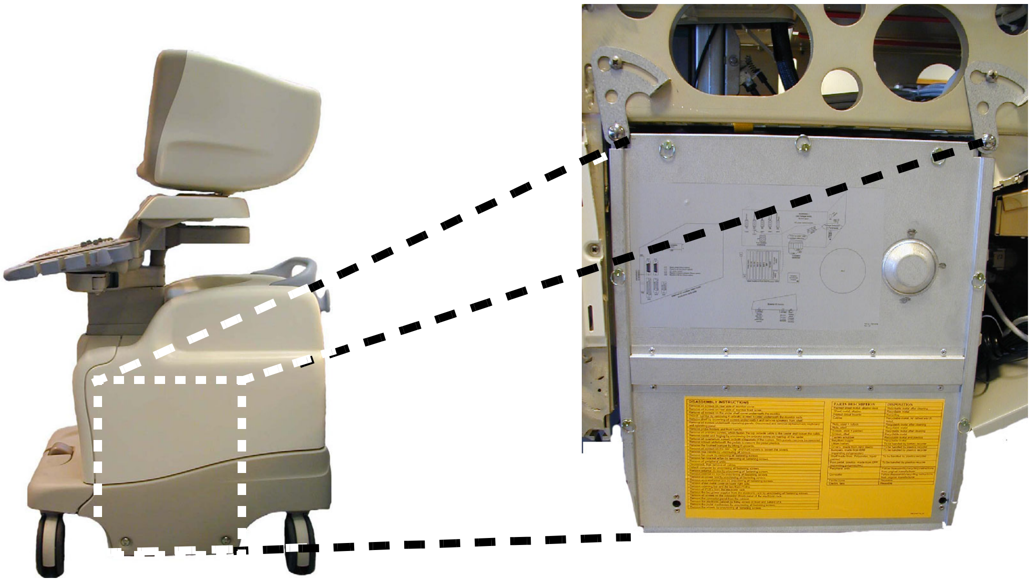
Table 9-30 Required Revisions for Cards and Modules, FEP2 sheet 1 of 2

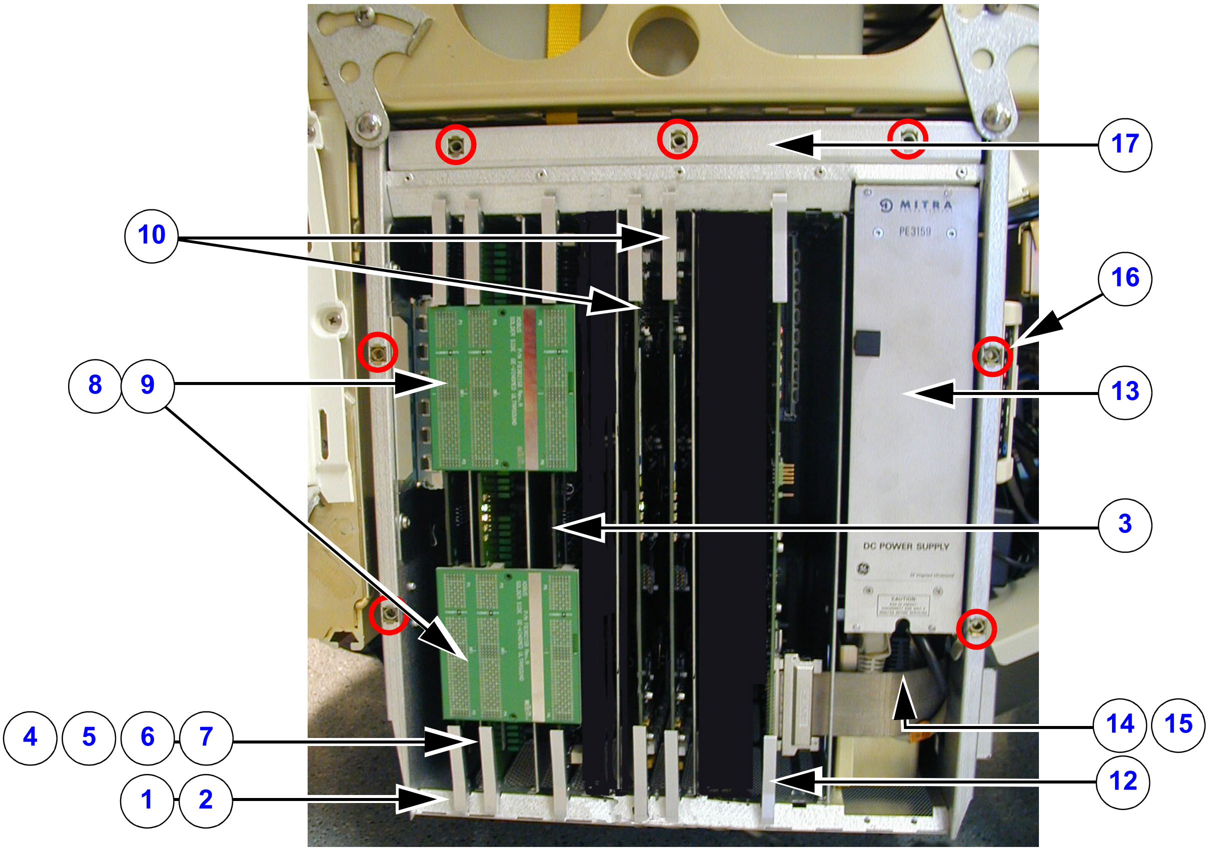
2nd VERSION OF FRONT-END CARD CAGE (FEP2)							
PART NUMBER	**NAME**	**BT’03 (SW. v3.2.x/ v3.4.x/ v3.6.x)**	**BT’04 (SW. v4.x)**	**BT’05 (SW. v5.x)**	**BT’06 (SW. v6.x)**	**BT’08 (SW. v7.x)**	**COMMENTS**
		MCD	**MCD**	**MCD**	**MCD**	**MCD**	
FC200230	BACK-PLANE	02	02	02	02	02	
FB200060	RLY-3	07	07	07	07	07	RELAY BOARD VERSION 3 - MCD REV 14 Value of internal fuse increased to solve issue that Pedof probe is not recognized due to defective fuse. - MCD REV 13 includes a noise fix for noise in Color Flow that was a result of changes on MCD rev 12. - MCD REV 11 includes a noise-fix to avoid noise in CW duplex with M3S probe. - MCD REV 09 includes a noise-fix for M3S probe- MCD REV 08 has LEDs for +5V and +12V.
FC200314	RLY-4	N/A	02	02	02	02	RELAY BOARD VERSION 4 TO BE USED IN UNITS WITH 3D
FC200057	RX128-4	02	02	02	02	02	RECEIVER BOARD VERSION 4

Table 9-30 Required Revisions for Cards and Modules, FEP2 (cont'd) sheet 2 of 2

2nd VERSION OF FRONT-END CARD CAGE (FEP2)							
PART NUMBER	NAME	BT'03 (SW. v3.2.x/ v3.4.x/ v3.6.x)	BT'04 (SW. v4.x)	BT'05 (SW. v5.x)	BT'06 (SW. v6.x)	BT'08 (SW. v7.x)	COMMENTS
		MCD	MCD	MCD	MCD	MCD	
FC200459	TX128-5	03	03 (requires software v4.2.0 or later)	03	03	03	TRANSMITTER BOARD VERSION 5 2X TO BE USED IN UNITS WITH RT3D/4D **NOTE! Do not install one FC200459 and one FC200375 in the same Vivid 7.** - MCD REV 07 DOC. ERROR FIX. - MCD REV 06 Improved Manufacturing process. - MCD REV 05 Improved tolerances. (Manufacturing). - MCD REV 04 Removed unused components. - MCD REV 03 is the first released version of this card.
FC200375	TX128-4	01	03	03	03	03	TRANSMITTER BOARD VERSION 4 2X TO BE USED IN UNITS WITH RT3D/4D. **NOTE! Do not install one FC200459 and one FC200375 in the same Vivid 7.**
FC200239	XDBUS-3	01	01	01	01	01	TRANSDUCER BUS BOARD VERSION 3 2X USED
FC200364	XDBUS-4	N/A	01	01	01	01	TRANSDUCER BUS BOARD VERSION 4 2X USED TO BE USED IN UNITS WITH RT3D/4D
FC200100	BF64 WITH 4 MLA	01	01	01	01	01	2X USED
FC200054	RFI	04	N/A	N/A	N/A	N/A	INTRODUCED 2003. FOR UNITS WITHOUT SUPPORT FOR 3D OPTION. OBSOLETE, PLEASE ORDER FC200507
FC200507	RFI	01	02	02	02	02	CARD WITH SUPPORT FOR 3D OPTION
FA200945	POWER, DC	02	02	02	02	02	Issues on some systems when using 3V PROBE in CW. mode. OBSOLETE, PLEASE ORDER FD200041
FD200041	POWER, DC	01	01	01	01	01	Increased +6VDC output current for use with 3V PROBE in CW mode.
FB200574	POWER, TX (TXPS)	02	N/A	N/A	N/A	N/A	BT'03: USED IN ALL SYSTEMS BT'04 and later:**DON'T USE**.
FC200386	POWER, TX (TXPS)	N/A	03	03	03	03	BT'04 and later: TO BE USED IN ALL SYSTEMS.

9-18-3 Front-End Processor Version 2 FRU Parts

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DC POWER SUPPLY

Figure 9-17 PCB Boards FEP2

9-18-3 Front-End Processor Version 2 FRU Parts (cont'd)

Table 9-31 PCB Boards used in FEP- 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	RLY-3_MODULE	FB200060	RELAY PCB, VERSION 3	1	Y
2	RLY-4	FC200314	RELAY PCB, VERSION 4. INTRODUCED 2004	1	Y
3	RX 128 BOARD VER. 4	FC200057	PCB RX-128-4, RECEIVER PCB, VERSION 4	1	Y
4	TX128-5	FC200459	PCB TX-128-5, VERSION 5 - USED ON FEP2 (RFI) WITHOUT 4D: 1X USED Introduced 2005 for use on new systems.	1	Y
5	TX128-5	FC200459	PCB TX-128-5, VERSION 5 - USED ON FEP2 (RFI) WITH 4D: 2X USED Introduced 2005 for use on new systems.	2	Y
6	TX128-4, TX-BOARD FOR RFI	FC200375	PCB TX-128-4, VERSION 4 - USED ON FEP2 (RFI) WITHOUT 4D: 1X USED	1	Y
7	TX128-4, TX-BOARD FOR RFI	FC200375	PCB TX-128-4, VERSION 4 - USED ON FEP2 (RFI) WITH 4D: 2X USED	2	Y
8	XD BUS 3	FC200239	TRANSDUCER BUS PCB, VERSION 3 - USED ON FEP2	2	Y
9	XD BUS 4	FC200364	TRANSDUCER BUS PCB, VERSION 4 - USED ON FEP2 on units with 4D		
10	MODULE BF64_4MLA	FC200100	BEAM FORMER PCB	2	Y
12	RADIO FREQUENCY INTERFACE	FC200507	RADIO FREQUENCY INTERFACE PCB - USED ON FEP2-BT04	1	Y
13	POWER SUPPLY DC	FA200945	DC POWER SUPPLY (OBSOLETE)	1	N
		FD200041	DC POWER SUPPLY WITH INCREASED CURRENT OUTPUT ON +6VDC	1	Y
14	TRANSMITTER PS SWITCHED MODE	FB200574	TRANSMITTER POWER SUPPLY SWITCHED MODE FOR UNITS WITH SOFTWARE VERSION v3.2.x	1	Y
15	POWER, TX	FC200386	TRANSMITTER POWER SUPPLY SWITCHED MODE FOR UNITS WITH SOFTWARE VERSION v4.x / v5.x	1	Y
16	NUT PANEX STUDS	080B2000	RETAINER RECEPT (7 places)	7	Y
17	CARD-RACK COMPLETE	FC200308	RACK W/ MOTHERBOARD FEP2 (INTRODUCED 2ND HALF 2003)	1	Y

9-18-4 Hardware/Software Versions, Front-End Processor Version 1

This overview is valid for the following Vivid 7 models:

- FC000030, FC000060
- FC000180, FC000190, FC000200, FC000210
- FC000310, FC000320, FC000330, FC000340

Use Table 9-32 to verify the correct/needed revision on each card in the Card Rack (FEP1).

NOTE: *Units with FEP1 can't be upgraded to software version 4.0.0 or higher. For software version 4.0.0 the RFI card in FEP2 is required.*

Table 9-32 Required Revisions for Cards and Modules, Front-End Processor V1 (FEP1)

1st VERSION OF FRONT-END PROCESSOR CARD CAGE (FEP1)				
		v2.3.x/ v2.4.x	v3.1.x/ v3.3.x/ v3.5.x	
PART NUMBER	NAME	MCD	MCD	COMMENTS
FA200985	BACKPLANE (MOTHERBOARD)	02	02	
FB200060	RLY-3	06	06	- MCD REV 07 INCLUDES A NOISEFIX FOR USE OF TEE PROBE. - MCD REV 08 has LEDs for +5V and +12V. - MCD REV 09 includes a noise-fix for M3S probe - MCD REV 11 includes a noise-fix to avoid noise in CW duplex with M3S probe. - MCD REV 14 Value of internal fuse increased to solve issue that Pedof probe is not recognized due to defective fuse.
FB200170	TX128-2.	B	N/A	FOR VIVID 7. Used before 2003.
FC200022	TX128-3	01	01	REPLACEMENT FOR FB200170. PHASED INTO MANUFACTURING SECOND HALF OF 2002. NEEDED FOR ALL BT'03 UNITS WITH SOFTWARE VERSION V3.1.x.
FC200459	TX128-5	N/A	03	REQUIRES SOFTWARE VERSION V3.5.X
FB200831	RX128-3B	A,B	N/A	
FC200057	RX128-4	02	02	This card is compatible with Vivid 7 systems at Rev. v2.3.0/v2.4.0 and up.
FB200158	XDBUS-2	02	N/A	2X USED
FB200900	BF64	C/D/E	N/A	2X USED
FC200100	BF64 WITH 4 MLA	N/A	01	2X USED
FB200165	FEC-II	03, 04	03, 04	
FB200140	RFT1	B, C, D	N/A	BOTH MCD REV. B, C AND D MAY BE USED.
FC200394	RFT1	N/A	E	IMPROVED GREYSCALE (COMPARED TO FB200140) REQUIRES V3.1.x SOFTWARE
FB200865	SDP	02	02	
FB200991	IMP-2B	A,B	A,B	
FC200120	IMP-3	01	01	REPLACES FB200991 REQUIRES BEP2
FA200945	POWER, DC	02	02	OBSOLETE, Please order FD200041
FD200041	POWER, DC	01	01	REPLACES FA200945

Table 9-32 Required Revisions for Cards and Modules, Front-End Processor V1

1st VERSION OF FRONT-END PROCESSOR CARD CAGE (FEP1)				
		v2.3.x/ v2.4.x	v3.1.x/ v3.3.x/ v3.5.x	
PART NUMBER	NAME	MCD	MCD	COMMENTS
FB200574	POWER, TX (TXPS)	03	03	

9-18-5 Front-End Processor Version 1 FRU Parts

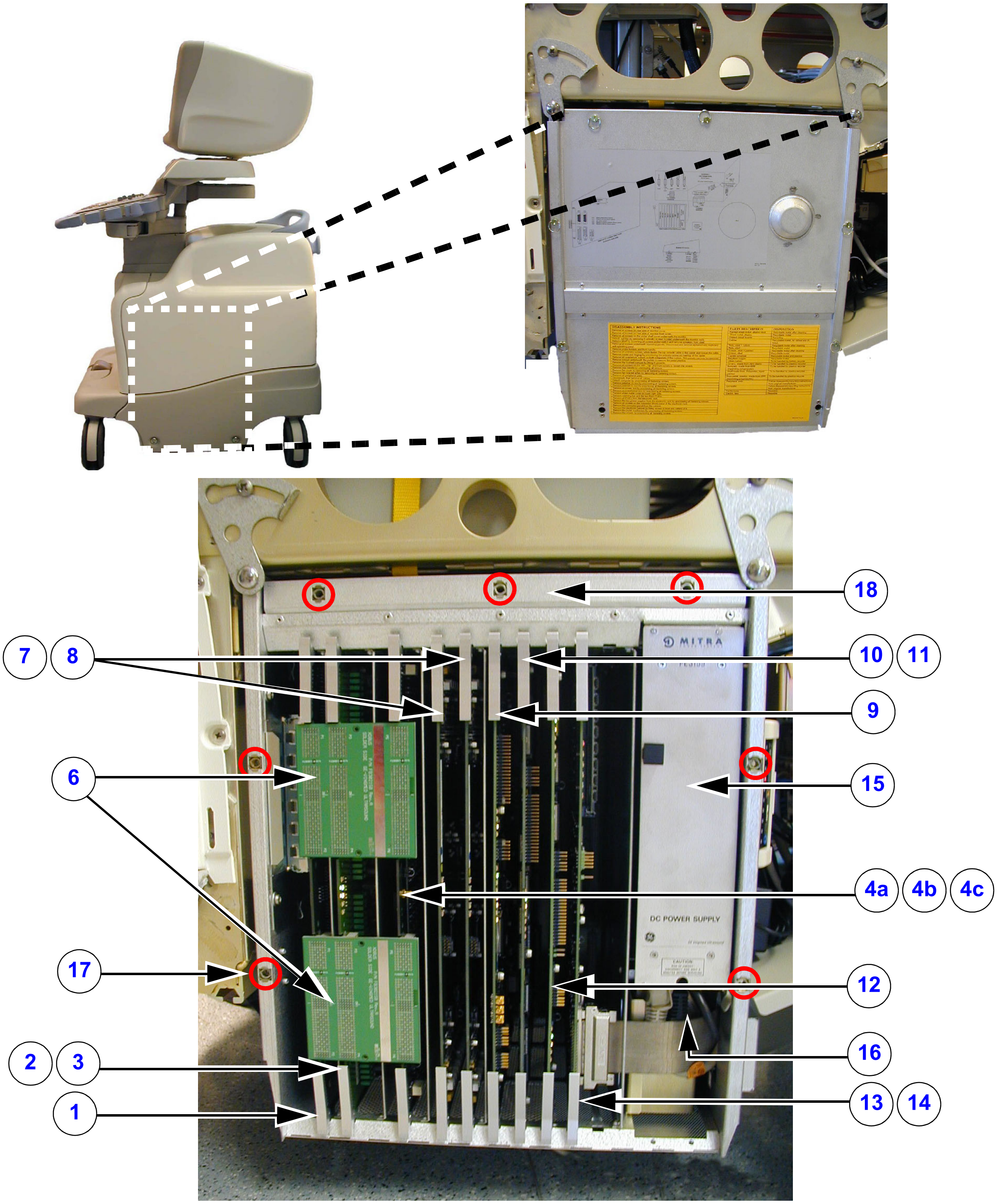
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Figure 9-18 PCB Boards - FEP1

Table 9-33 PCB Boards used in FEP1

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	RLY-3_MODULE	FB200060	RELAY PCB, VERSION 3	1	Y
2	RX 128-3B	FB200831	RECEIVER PCB, VERSION 3B	1	Y
3	RX 128 BOARD VER. 4	FC200057	RECEIVER PCB, VERSION 4 REQUIRES SOFTWARE VERSION v2.3.0 OR NEWER REPLACES FB200831	1	Y
4a	MODULE TX128-2	FB200170	TRANSMITTER 128 PCB, VERSION 2	1	Y
4b	TRANSMITTER BOARD	FC200022	TRANSMITTER 128 PCB, VERSION 3		Y
4c	RX 128 BOARD VER. 4	FC200057	TRANSMITTER 128 PCB, VERSION 4		Y
6	XDBUS-2 BOARD	FB200158	TRANSDUCER BUS PCB, VERSION 2	2	Y
7	PCB BF64	FB200900	BEAM FORMER PCB	2	Y
8	PCB BF64 4MLA	FC200100	BEAM FORMER PCB		Y
9	PCB FEC-II	FB200165	FRONT-END CONTROLLER PCB, VERSION 2	1	Y
10	PCB RF TISSUE	FB200140	RADIO FREQUENCY & TISSUE PCB	1	Y
11	PCB RF TISSUE	FC200394	RADIO FREQUENCY & TISSUE PCB (NEEDS SW V3.0.0 OR HIGHER)	1	Y
12	PCB SDP	FB200865	SPECTRUM DOPPLER PROCESSOR PCB	1	Y
13	PCB IMP-2B	FB200991	IMAGE PORT PCB, VERSION 2B	1	Y
14	PCB IMP-3	FC200120	IMAGE PORT PCB, VERSION 3 (NEEDS BEP2)		Y
15	POWER SUPPLY DC	FA200945	OBSOLETE, Please order FD200041	1	Y
		FD200041	DC POWER, REPLACES FA200945	1	Y
16	POWER, TX	FB200574	TRANSMITTER POWER SUPPLY SWITCHED MODE	1	Y
17	NUT PANEX STUDS	080B2000	RETAINER RECEPT (7 Places)	7	Y
18	RACK W/ MOTHERBOARD	FB200957	CARDRACK W/MOTHERBOARD, VIVID7	1	Y

Section 9-19
Back-End Processor

9-19-1 Overview

Several different Back-End Processors (BEPs) have been included in the Vivid 7 scanners and used as service parts, see table below.

Table 9-34 BEP overview

BEP MODEL	DESCRIPTION	LATEST SOFTWARE (LIST UPDATED 08.OCT.2007)	LINK
RFT SYSTEMS			
BEP (BEP1)	FIRST BEP VERSION, INTRODUCED 2001 (RFT)	V2.5.0, V3.5.0/V3.5.1, V3.6.0/V3.6.2	PAGE 9-60
BEP2	REPLACEMENT FOR BEP1, INTRODUCED 2002 (RFT)		PAGE 9-59
BEP4 as replacement for BEP1 & BEP2	INTRODUCED 2007 (RFT)		PAGE 9-53
RFI SYSTEMS			
BEP2.2	WAS RELEASED FOR USE WITH RFI 2003	V3.4.2	PAGE 9-58
BEP4 as replacement for BEP2.2	INTRODUCED 2007		PAGE 9-51
BEP3	INTRODUCED 2004	V4.2.0, V5.2.0, V6.1.0	PAGE 9-57
BEP3.2	INTRODUCED 2005	V5.2.0, V6.2.0	PAGE 9-57
BEP4.2 as replacement for BEP3.x	INTRODUCED FOR NEW PRODUCTS 2006 INTRODUCED AS REPLACEMENT FOR BEP3.x 2007	V4.2.0, V5.2.0, V6.1.3	PAGE 9-49
BEP4.3. Introduced for BT'08 systems	INTRODUCED FOR NEW PRODUCTS OCTOBER 2007	V7.0.0	PAGE 9-47

9-19-2 FRU Parts for Back-End Processor Version 4.3 (BEP4.3)

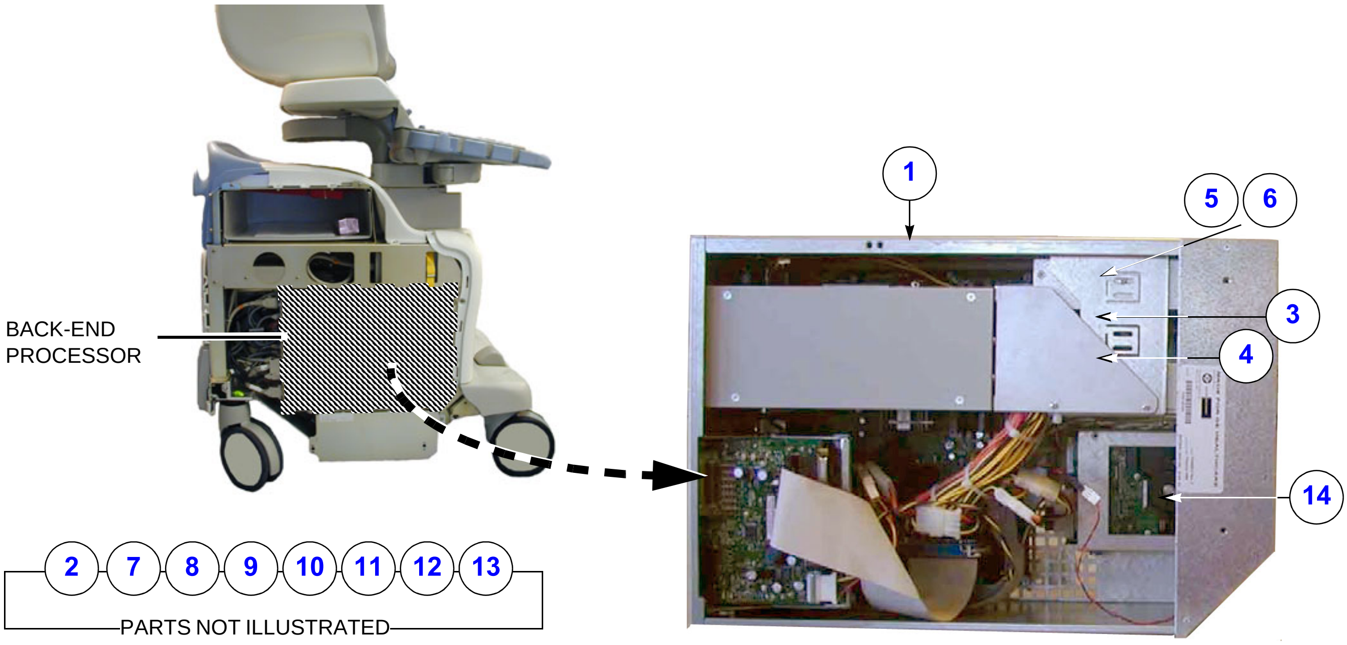


Figure 9-19 BEP 4.3 Parts

Table 9-35 BEP4.3 FRU Parts sheet 1 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP4 WITHOUT MO DRIVE	FD200135	Back-End Processor without MOD, without 4D Card. Use ONLY on units with RFI. If unit has BEP Ver. 4.3 w/4D with Part Number FD200145, order the part FD200135, BEP Ver. 4.3 wo/ 4D, and use the PCI Graphic card 066E0337 or 066E0339 from the old BEP.	1	Y
2	ATI_RADEON X800XL 256MB AIB	066E0337	USED FOR 4D ATI RADEON X800XL 256 MB AIB	1	Y
	ATI FireGL V7200 256MB PCI-X DVI	066E0339	USED FOR 4D (REPLACES 066E0337 in production systems) ATI FireGL V7200 256 MB PCI-X DVI/DVI NOTE! USE 066E0337 AS FRU AS LONG AS THIS PART IS UNAVAILABLE	1	Y
3	MO DRIVE, 9.1 GB	FC200271	OPTIONAL: MOD DRIVE WITH MOUNTING BRACKETS	1	Y
4	BEP POWER SUPPLY	066E7503	Power Supply Enermax 465AX-VE for Bep 4	1	Y
	SECURING CLAMP F/MAIN POWER CABLE	064G7010		1	Y
5	DVD DRIVE	2404028-10	BEP4.3 DVD FRU (LG GSA-H54N)	1	Y

Table 9-35 BEP4.3 FRU Parts (cont'd) sheet 2 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
6	PATIENT IO MODULE	FC200685	WITH USB-1.1 INTERFACE. INTRODUCED FOR BEP3.2	1	Y
	PATIENT IO MODULE	FC200805	WITH USB-2.0 INTERFACE. INTRODUCED FOR BEP4.2	1	Y
7	FAN FOR BACK END PROCESSOR	2404028-11	For BEP3.x and BEP4.x	1	Y
8	PC2IP MODULE	FC200617		1	Y
	PC2IP2B	FC200656	Communication between BEP and FEP2 (PC2IP)	1	Y
	PC2IP3	FC200755	Communication between BEP and FEP2 (PC2IP) This card will be phased in when PC2IP2B becomes obsolete	1	Y
		FD200033	Communication between BEP and FEP2 (PC2IP) This card will be phased in when FC200755 becomes obsolete		
9	DGVIC-DGIO TRAY, COMPLETE	FC200958	Replaces FC200676	1	Y
10	DVI Loopback Cable	2354056		1	Y
11	FILTER ASSEMBLY FOR BEP VIVID7	FC200631		1	Y
12	BIOS Blaster	FC200832		1	Y
13	System Software (Base Image)	FC200824	Vivid 7 System sw v.2.x.x for BEP4	1	Y
	System Software (Base Image)	FD200078	Vivid 7 System sw v.3.x.x for BEP4	1	Y
14	SATA 160GB HDD BEP4 HDD FRU	2404028-1	160 GIGABYTES SATA HARD DISK DRIVE FOR BEP4. MOUNTING HARDWARE INCLUDED.	1	Y
	BEP CMOS BATTERY	2404028-7		1	Y
	FALCON FRAME GRABBER PCI	066E0333	Used in units with FEP2	1	Y
	PATIENT IO BT06	FC200805	WITH USB-2.0 INTERFACE. INTRODUCED FOR BT'06, but will be phased into production when FC200685 becomes obsolete.	1	Y

9-19-3 FRU Parts for Back-End Processor Version 4.2 (BEP4.2)

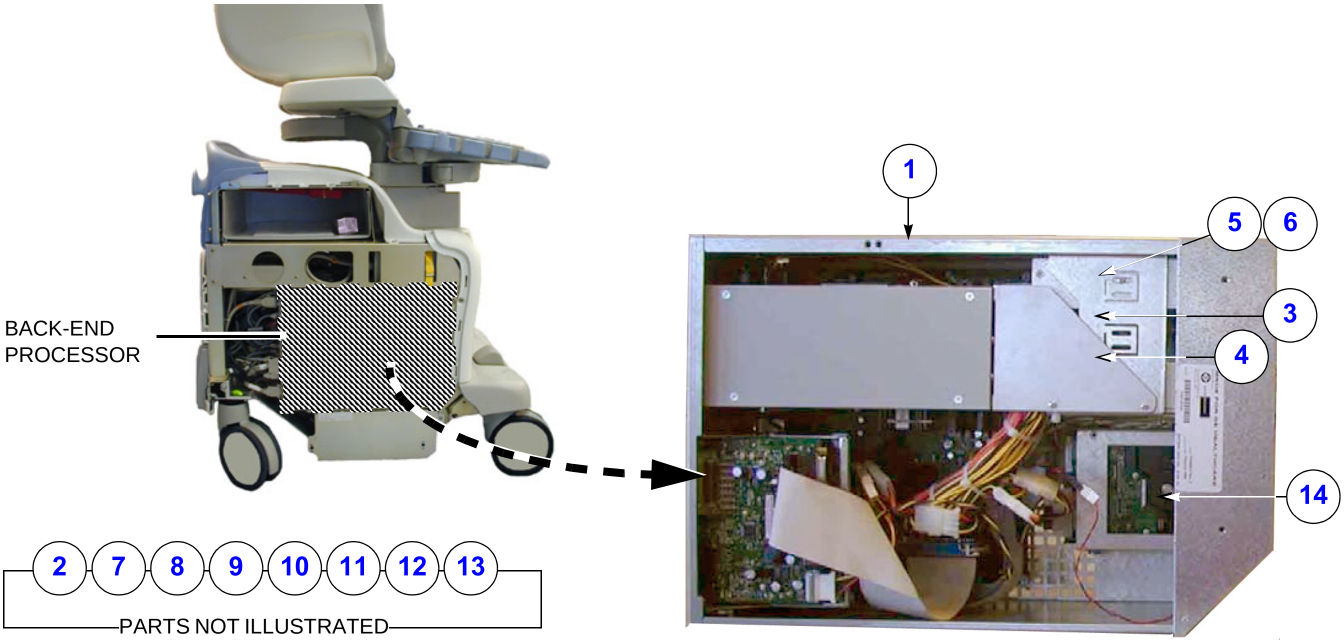


Figure 9-20 BEP 4.2 Parts

Table 9-36 BEP4.2 FRU Parts sheet 1 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP4 WITHOUT MO DRIVE	FC200817	Back-End Processor without MOD, without 4D Card. Use ONLY on units with RFI. If unit has BEP Ver. 4.2 w/4D with Part Number FC200818, order the part FC200817, BEP Ver. 4.2 wo/ 4D, and use the PCI Graphic card 066E0337 or 066E0339 from the old BEP.	1	Y
2	ATI_RADEON X800XL 256MB AIB	066E0337	USED FOR 4D ATI RADEON X800XL 256 MB AIB	1	Y
	ATI FireGL V7200 256MB PCI-X DVI	066E0339	USED FOR 4D (REPLACES 066E0337 in production systems) ATI FireGL V7200 256 MB PCI-X DVI/DVI NOTE! USE 066E0337 AS FRU AS LONG AS THIS PART IS UNAVAILABLE	1	N
3	MO DRIVE, 9.1 GB	FC200271	OPTIONAL: MOD DRIVE WITH MOUNTING BRACKETS	1	Y
4	BEP POWER SUPPLY	066E7503	Power Supply Enermax 465AX-VE for Bep 4	1	Y
	SECURING CLAMP F/MAIN POWER CABLE	TBD		1	N
5	BEP3 DVD FRU for Logiq 9 and Vivid 7	2404028		1	Y

Table 9-36 BEP4.2 FRU Parts (cont'd) sheet 2 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
6	PATIENT IO MODULE	FC200685	WITH USB-1.1 INTERFACE. INTRODUCED FOR BEP3.2	1	Y
	PATIENT IO MODULE	FC200805	WITH USB-2.0 INTERFACE. INTRODUCED FOR BEP4.2	1	Y
7	FAN FOR BACK END PROCESSOR	2404028-11	For BEP3.x and BEP4.x	1	Y
8	PC2IP MODULE	FC200617		1	Y
	PC2IP2B	FC200656	Communication between BEP and FEP2 (PC2IP)	1	Y
	PC2IP3	FC200755	Communication between BEP and FEP2 (PC2IP) This card will be phased in when PC2IP2B becomes obsolete	1	Y
		FD200033	Communication between BEP and FEP2 (PC2IP) This card will be phased in when FC200755 becomes obsolete		
9	DGVIC-DGIO TRAY, COMPLETE	FC200958	Replaces FC200676	1	Y
10	DVI Loopback Cable	2354056		1	Y
11	FILTER ASSEMBLY FOR BEP VIVID7	FC200631		1	Y
12	BIOS Blaster	FC200832		1	Y
13	System Software (Base Image)	FC200824	Vivid 7 System sw v.2.x.x for BEP4	1	Y
	System Software (Base Image)	FD200078	Vivid 7 System sw v.3.x.x for BEP4	1	Y
14	HARD DISK 80GB SATA BEP4 HDD FRU	066E0523	80 GIGABYTES SATA HARD DISK DRIVE FOR BEP4. MOUNTING HARDWARE INCLUDED.	1	Y
	HARD DISK 160GB SATA BEP4 HDD FRU	2404028-1	160 GIGABYTES SATA HARD DISK DRIVE FOR BEP4. MOUNTING HARDWARE INCLUDED.	1	Y
	BEP CMOS BATTERY	2404028-7		1	Y
	FALCON FRAME GRABBER PCI	066E0333	Used in units with FEP2	1	Y
	PATIENT IO BT06	FC200805	WITH USB-2.0 INTERFACE. INTRODUCED FOR BT'06, but will be phased into production when FC200685 becomes obsolete.	1	Y

9-19-4 FRU Parts for BEP 4 as Replacement for BEP 2.2

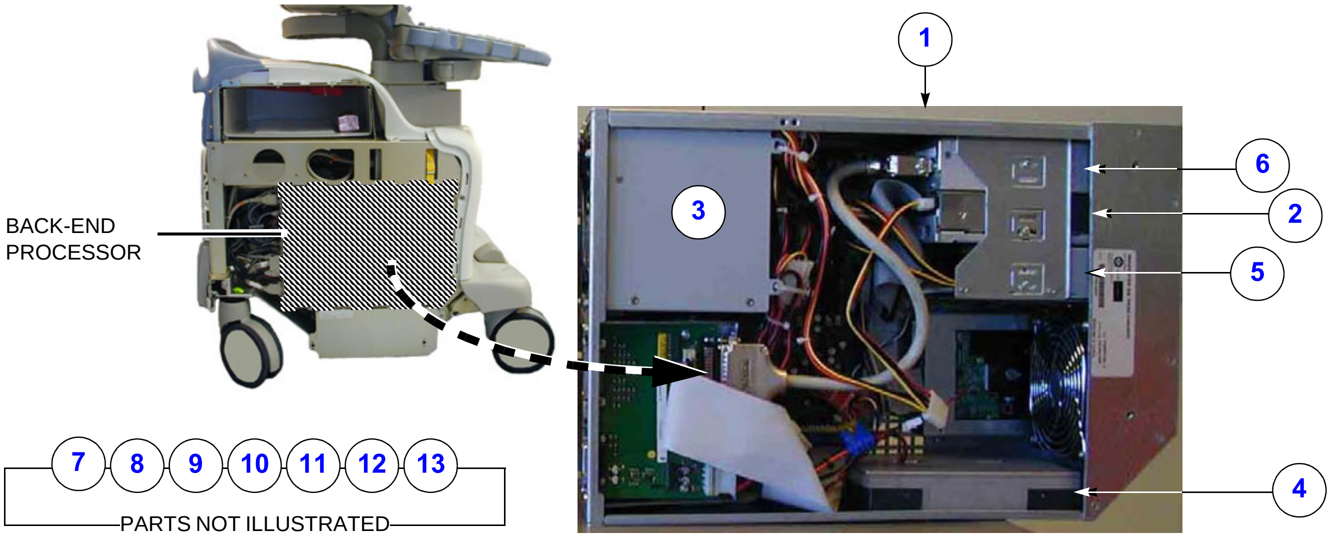


Figure 9-21 BEP4 (as replacement for BEP2.2)

Table 9-37 FRUs for BEP4 as Replacement for BEP 2.2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP4 WITHOUT MO DRIVE	FC200813	Back-End Processor without MOD, with Frame Grabber. Use ONLY on units with RFI.	1	Y
2	MO DRIVE, 9.1 GB	FC200271	MOD DRIVE WITH MOUNTING BRACKETS	1	Y
3	POWER SUPPLY	2404028-4	POWER SUPPLY WITH UPS	1	Y
4	BATTERY ASSEMBLY	2266548-5		1	Y
5	DVD DRIVE	2404028 OR 2404028-10	2404028-10 REQUIRES A SOFTWARE PATCH	1	Y
6	PATIENT IO MODULE (FRU)	2348186-22	SAME AS FA200801 MCD REVISION F OR HIGHER OR 01 (OR HIGHER) MAY ALSO BE USED.	1	Y
7	FAN FOR BACK END PROCESSOR	2404028-11	For BEP3, BEP3.2 and BEP4.x	1	Y
8	BEP3 HDD FRU	2404028-2	80 GBYTES SATA HARD DISK DRIVE FOR BEP3. MOUNTING HARDWARE INCLUDED.	1	Y
	Hard Disk Drive 160GB	2404028-1		1	N
9	PC2IPIIB	FC200656	Communication between BEP and FEP2 (PC2IP 2B)	1	Y
9	DGVIC TRAY, COMPLETE	FC200676		1	Y
10	DVI Loopback Cable	2354056			
	BIOS BLASTER	FC200832		1	Y
	System Software (Base Image)	FD200035		1	Y

Table 9-37 FRUs for BEP4 as Replacement for BEP 2.2 (cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
	FILTER ASSEMBLY FOR BEP3 VIVID7	FC200631		1	Y
	SECURING CLAMP F/MAIN POWER CABLE	TBD		1	N

9-19-5 FRU Parts for BEP4 as Replacement for BEP2.0

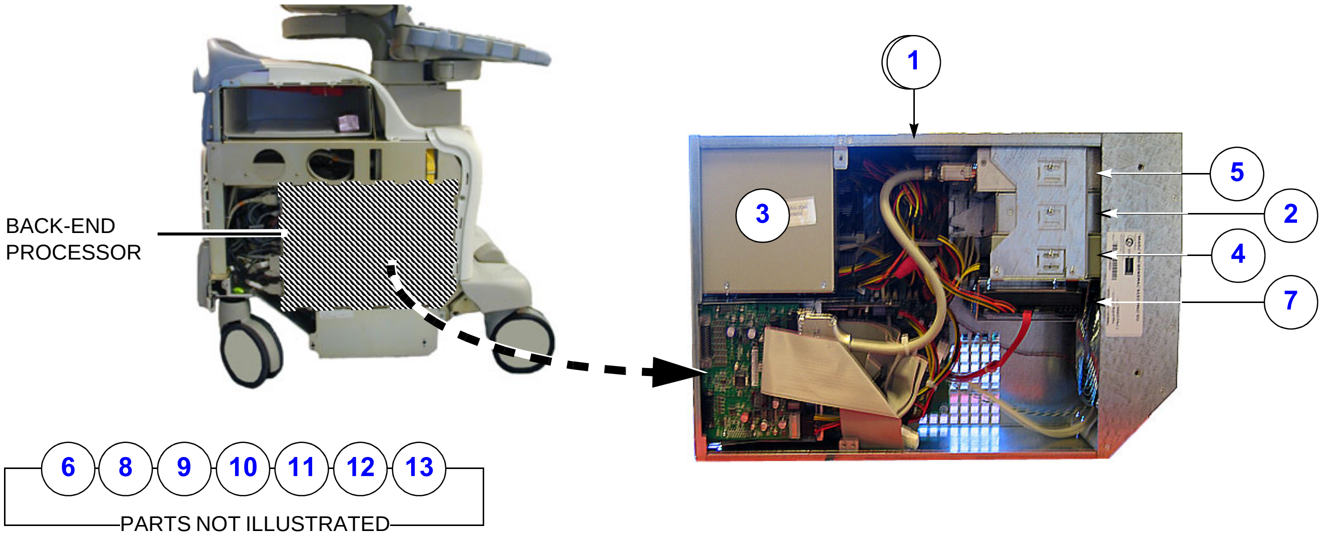


Figure 9-22 BEP 4 Parts

Table 9-38 FRUs for BEP4 as Replacement for BEP2.0 sheet 1 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP4 WITHOUT MO DRIVE	FC200809	Back-End Processor without MOD, with Frame Grabber. Use ONLY on units with RFT.	1	Y
2	MO DRIVE, 9.1 GB	FC200271	MOD DRIVE WITH MOUNTING BRACKETS	1	Y
3	POWER SUPPLY, w/UPS	2404028-4	Power Supply for BEP w/UPS	1	Y
	SECURING CLAMP F/MAIN POWER CABLE	TBD		1	N
4	DVD DRIVE	2404028 OR 2404028-10	2404028-10 REQUIRES A SOFTWARE PATCH	1	Y
5	PATIENT IO MODULE (FRU)	2348186-22	SAME AS FA200801 MCD REVISION F OR HIGHER OR 01 (OR HIGHER) MAY ALSO BE USED.	1	Y
6	FAN FOR BACK END PROCESSOR	2404028-11	For BEP3, BEP3.2 and BEP4.x	1	Y
7	BEP3 HDD FRU	2404028-2	80 GBYTES SATA HARD DISK DRIVE FOR BEP3. MOUNTING HARDWARE INCLUDED.	1	Y
	HARD DISK DRIVE 160GB	2404028-1		1	Y
8	PC2IP2B	FC200656	Communication between BEP and FEP2 (PC2IP 2B)	1	Y
9	GRAPHIC CARD	066E0334		1	Y
10	DGVIC TRAY, COMPLETE	FC200676		1	Y
11	DVI LOOPBACK CABLE	2354056		1	Y

Table 9-38 FRUs for BEP4 as Replacement for BEP2.0 (cont’d) sheet 2 of 2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
12	FILTER ASSEMBLY FOR BEP3 VIVID7	FC200631		1	Y
15	BATTERY ASSEMBLY	2266548-5		1	Y
	BIOS BLASTER	FC200832		1	Y
	SYSTEM SOFTWARE (BASE IMAGE)	FC200825		1	Y

9-19-6 FRU Parts for Back-End Processor Version 3.2 (BEP3.2)

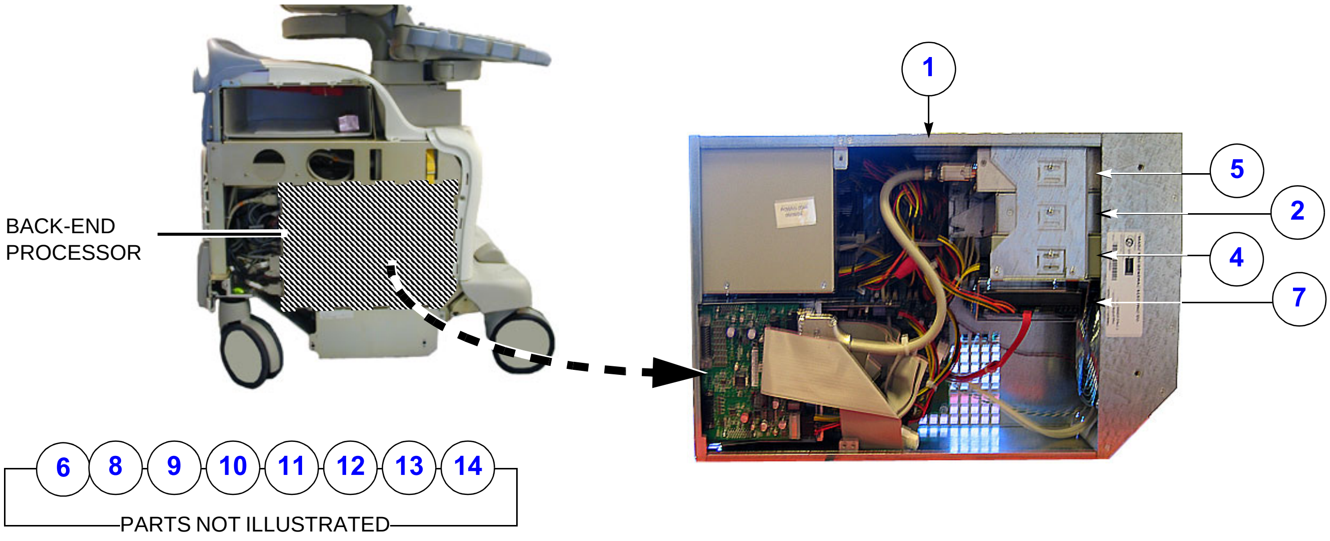
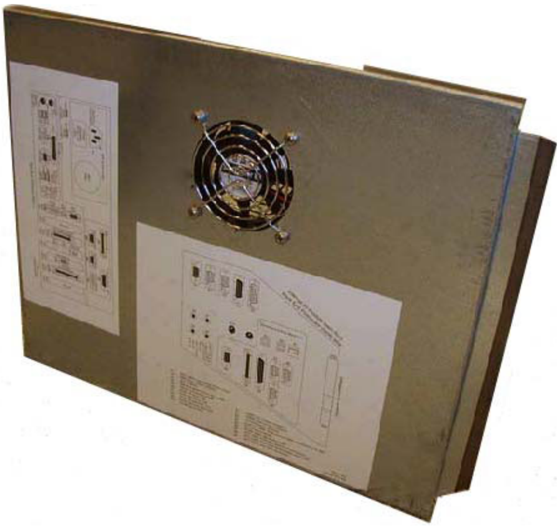


Figure 9-23 BEP3.2 Parts

Table 9-39 BEP3.2 FRU Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP3.2 WITHOUT MO DRIVE	2404027-10	Back-End Processor without MOD, with Frame Grabber. Use ONLY on units with RFI.	1	Y
2	MO DRIVE, 9.1 GB	FC200271	MOD DRIVE WITH MOUNTING BRACKETS	1	Y
3	BEP POWER SUPPLY	066E7500U	Antec True430P 430W Power Supply BEP3 Replacement for 066E7500 and 066E7502	1	Y
		066E7502U	Power Supply Enermax465AX-VE Replacement for 066E7500 and 066E7502		
		066E7503	Power Supply Enermax 465AX-VE for Bep 4 Replacement for 066E7500, 066E7500U, 066E7502 and 066E7502U		
		066E7505	Power 333521 EG465AX-VE G Alternative replacement for 066E7500/0667500U, 066E7502/066E7502U and 066E7503		
4	DVD DRIVE	2404028	BEP3 DVD FRU	1	Y
5	PATIENT IO MODULE (FRU)	FC200685	WITH USB INTERFACE. INTRODUCED FOR BT’05	1	Y
6	FAN FOR BACK END PROCESSOR BEP3	2404028-11	For BEP3 & BEP3.2	1	Y
7	BEP3 HDD FRU	2404028-2	80 GBYTES SATA HARD DISK DRIVE FOR BEP3. MOUNTING HARDWARE INCLUDED.	1	Y
8	PC2IP2B	FC200656	Communication between BEP and FEP2 (PC2IP 2B)	1	Y
9	FALCON FRAMEGRABBER PCI	066E0333	Used in units with FEP2	1	Y
10	AGP 4D GRAPHIC CARD	066E0338/ 066E0334		1	Y

Table 9-39 BEP3.2 FRU Parts (cont'd)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
11	DGVIC TRAY, COMPLETE	FC200676		1	Y
12	BEP CMOS BATTERY	2404028-7		1	Y
13	FILTER ASSEMBLY FOR BEP3 VIVID7	FC200631		1	Y
14	V7, BEP3 SIDE COVER WITH FAN	FC200759		1	Y

9-19-7 FRU Parts for Back-End Processor Version 3.0 (BEP3.0)

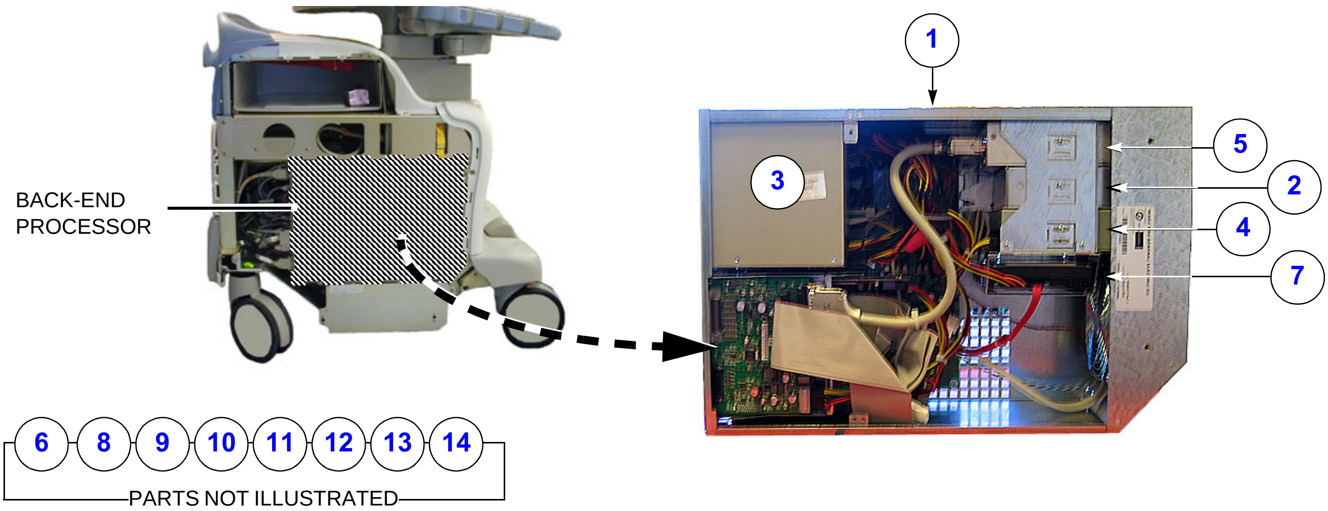


Figure 9-24 BEP3 Parts

Table 9-40 BEP3 FRU Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP3 WITHOUT MO DRIVE	2404027	Back-End Processor without MOD, with Frame Grabber. Use ONLY on units with RFI.	1	Y
2	MO DRIVE, 9.1 GB	FC200271	MOD DRIVE WITH MOUNTING BRACKETS	1	Y
3	BEP POWER SUPPLY	066E7502	Replaces 066E7500	1	Y
4	DVD DRIVE	2404028	BEP3 DVD FRU	1	Y
5	PATIENT IO MODULE (FRU)	2348186-22		1	Y
6	FAN FOR BACK END PROCESSOR BEP3 (FRU)	2404028-11	For BEP3	1	Y
7	BEP3 HDD FRU	2404028-2	80 GBYTES SATA HARD DISK DRIVE FOR BEP3. MOUNTING HARDWARE INCLUDED.	1	Y
8	PC2IPII	FC200312	Communication between BEP and FEP2 (PC2IP 2B)	1	Y
		FC200656	Replaces FC200312		
9	FALCON FRAMEGRABBER PCI	066E0333	Used in units with FEP2	1	Y
10	GRAPHIC CARD	066E0338/ 066E0334		1	Y
11	DGVIC TRAY, COMPLETE	FC200676		1	Y
12	BEP CMOS BATTERY	2404028-7		1	Y
13	FILTER ASSEMBLY FOR BEP3 VIVID7	FC200631		1	Y
14	V7, BEP3 SIDE COVER WITH FAN	FC200759		1	Y

9-19-8 FRU Parts for Back-End Processor Version 2.2 (BEP2.2)

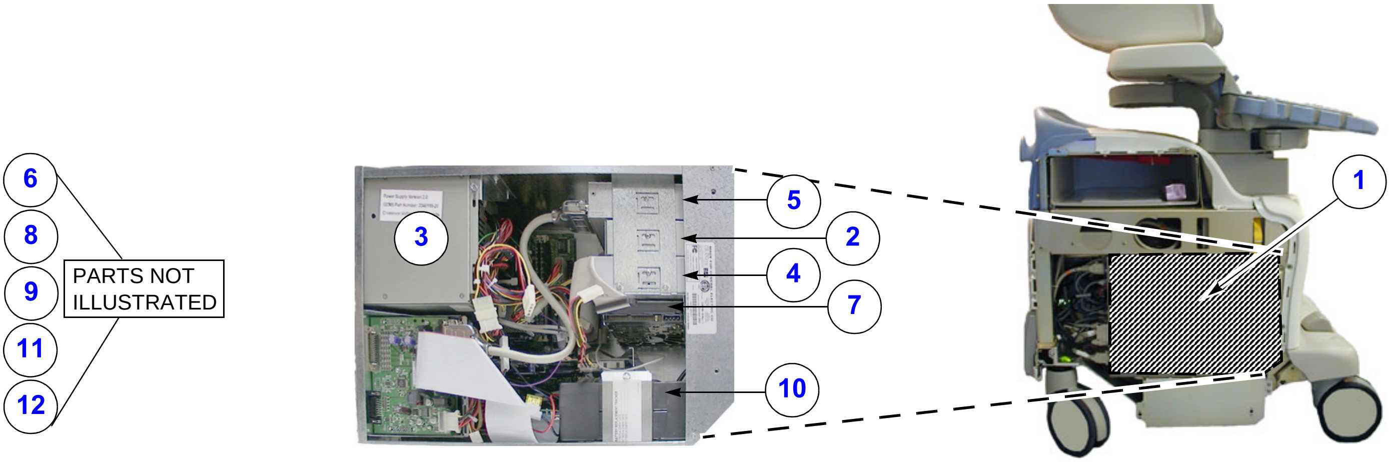
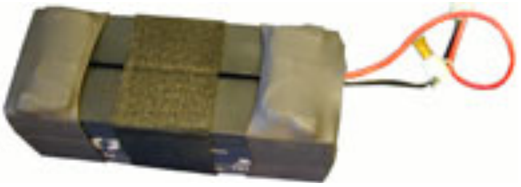


Figure 9-25 Back-End Processor Parts - BEP2.2

Table 9-41 Back-End Processor Parts - BEP2.2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP 2.2 W/O MO DRIVE IDUNN-2.3 PS	2348186-60	Back-End Processor without MOD, with Frame Grabber. Use ONLY on units with RFI.	1	Y
2	MO-DRIVE W/MOUNTING BRACKETS	FC200271	MO DRIVE	1	Y
3	POWER SUPPLY, 2.3 FRU	2348186-38	Power Supply for BEP (Rev.2.3)	1	Y
4	DRIVE, CD-RW SONY FRU	2348186-37	For BEP2 ONLY	1	Y
5	PATIENT IO MODULE (FRU)	2348186-22		1	Y
6	FAN FOR BACK END PROCESSOR BEP2(FRU)	2348186-25	For BEP2	1	Y
7	40 GB HD FOR BEP2.X W/MT HWR (FRU)	2348186-31	BEHIND BATTERY IN ILLUSTRATION	1	Y
8	PC2IPII	FC200312	Communication between BEP and FEP2, PC2IP2B	1	Y
9	FALCON FRAMEGRABBER PCI	066E0333	Used in units with FEP2	1	Y
10	BATTERY BACKEND PROCESSOR ASM	2266548-5		1	Y
11	PC VIDEO CONVERTER BOARD	FB200274	PCVIC CARD INSIDE BEP	1	Y
12	PC2 I/O MODULE	FB200199	CARD INSIDE BEP	1	Y

9-19-9 FRU Parts for Back-End Processor Version 2 (BEP2)

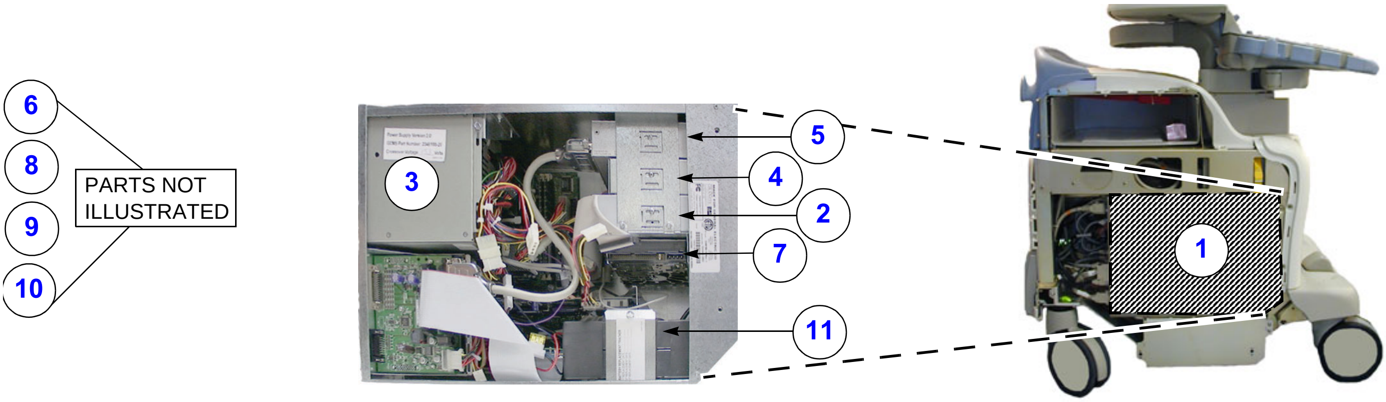


Figure 9-26 Back-End Processor Parts - BEP2

Table 9-42 Back-End Processor Parts - BEP2

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP2 WITHOUT MO DRIVE	2348186-40	BACK-END PROCESSOR WITHOUT MOD	1	Y
2	MO-DRIVE W/MOUNTING BRACKETS	FC200271	MO DRIVE	1	Y
3	POWER SUPPLY, 2.3 FRU	2348186-38	Power Supply for BEP (Rev.2.3)	1	Y
4	DRIVE, CD-RW SONY FRU	2348186-37	For BEP2 ONLY	1	Y
5	PATIENT IO MODULE (FRU)	2348186-22		1	Y
6	FAN FOR BACK END PROCESSOR BEP2(FRU)	2348186-25	For BEP2	1	Y
7	40 GB HD FOR BEP2.X W/MT HWR (FRU)	2348186-31	BEHIND BATTERY IN ILLUSTRATION	1	Y
8	PC2 I/O MODULE	FB200199	CARD INSIDE BEP	1	Y
9	PC VIDEO CONVERTER BOARD	FB200274	CARD INSIDE BEP	1	Y
10	PC2IP II	FC200617	CARD INSIDE BEP, used for Communication between BEP and FEP1 Replacement for FB200973	1	Y
	PC2IP II	FB200973	CARD INSIDE BEP, used for Communication between BEP and FEP1		
11	BATTERY BACKEND PROCESSOR ASM	2266548-5		1	Y

9-19-10 FRU Parts for Back-End Processor Version 1 (BEP1)

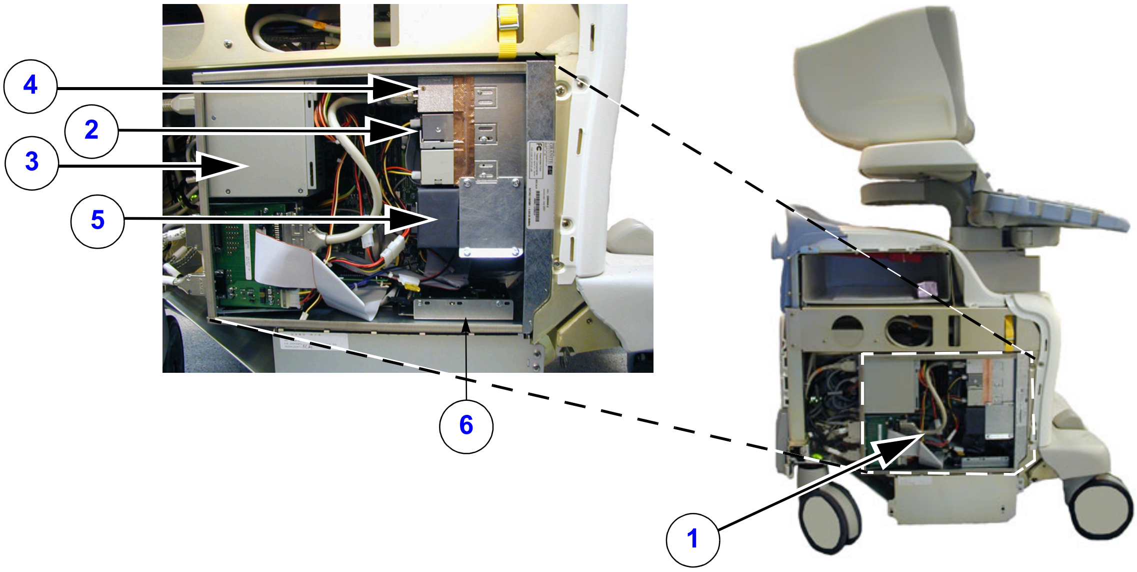


Figure 9-27 Back-End Processor Parts - BEP1

Table 9-43 Back-End Processor Parts - BEP1

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BEP (BACK-END PROCESSOR)	See Below	First Version of Back-End Processor (BEP1)	1	Y
	BEP WITHOUT MO DRIVE	2266548	Back-End Processor without Magneto Optical Drive		
	BEP WITH MO DRIVE	2266548-2	Back-End Processor Complete, with 9.1 GB, 5 1/4" Magneto Optical Drive		
2	MO-DRIVE W/MOUNTING BRACKET	FC200271		1	Y
3	POWER SUPPLY, 2.3 FRU	2348186-38	Power Supply for BEP (Rev. 2.3)	1	Y
4	PATIENT IO MODULE FRU	2348186-22		1	Y
5	BATTERY BACKEND PROCESSOR ASM	2266548-5		1	Y
6	HARD DRIVE FOR BEP1.0 (FRU)	2366650		1	Y

Section 9-20
AC Power Parts

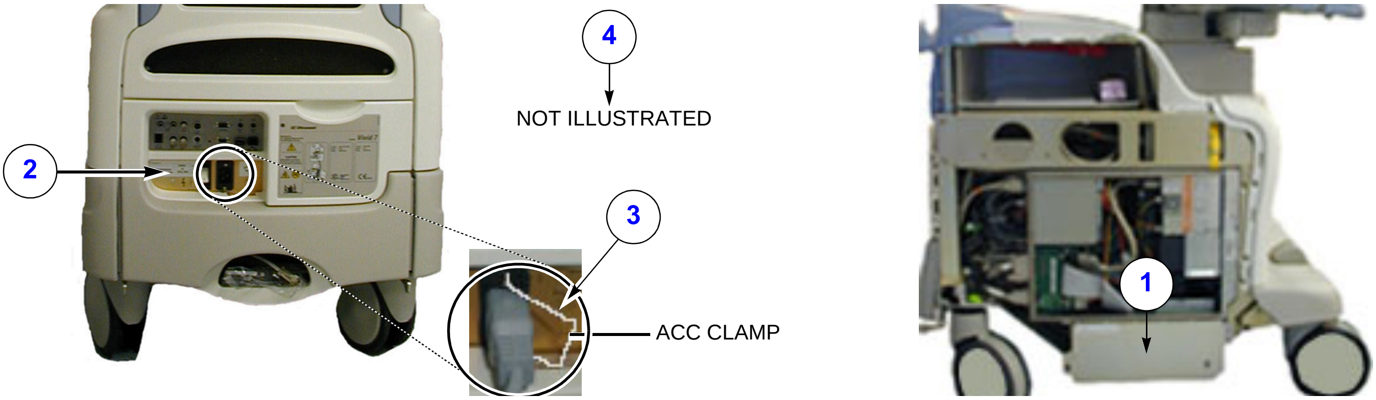


Figure 9-28 AC Power Parts

Table 9-44 AC Power Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	AC TRAFO BOX COMPLETE	FB200581	TRANSFORMER BOX COMPLETE	1	Y
2	AC CONTROLLER (AC Power) [voltage]	See below	See below	1	Y
	AC POWER 100-120V	FC200079	For Field Service use. Replaces FB200724 on 100-120 VAC Systems. AC CONTROLLER 100-120V		
	AC POWER 100-120V FRU VERSION	FC200403	For Field Service use. Replaces FB200724 and FC200079 on 100-120 VAC Systems.		
	AC POWER 220-240V	FC200081	For Field Service use. Replaces FB200724 on 220-240 VAC Systems.		
	AC POWER 220-240V FRU VERSION	FC200404	For Field Service use. Replaces FB200724 and FC200081 on 220-240 VAC Systems.		
3	ACC CLAMP	068E4000	AC CONTROLLER CLAMP WITH 2X SCREWS	1	Y
4	AC DISTRIBUTION BOX	FB307828	USED FOR DISTRIBUTING AC POWER INSIDE SCANNER	1	N

Section 9-21
Input /Output Modules

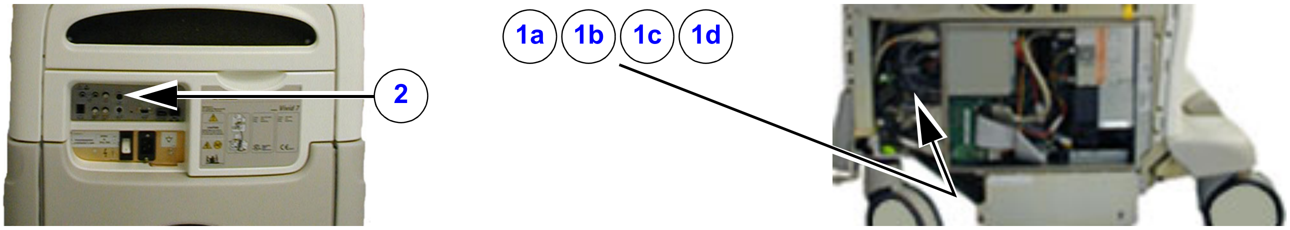


Figure 9-29 Input/Output Modules

Table 9-45 Input/Output Modules

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
	INTERNAL I/O				
1a	INTERNAL I/O BOARD (FRU)	FC200695	WHEN USED AS A REPLACEMENT PART FOR: - FB200197 OR - FC200423: REPLACE THE “BEP TO INT I/O CABLE” (FC200286 OR FB200799). NEW CABLE: “BEP TO INT I/O CABLE” 2404419. WHEN USED AS A REPLACEMENT PART FOR: - FC200695 THE NEW CABLE (2404419) IS ALREADY IN USE	1	Y
1b	INTERNAL IO MODULE, V7, L9	FC200651	WHEN USED AS A REPLACEMENT PART FOR: - FC200446: REPLACE THE “BEP TO INT I/O CABLE” (FC200286 OR FB200799). NEW CABLE: “BEP TO INT I/O CABLE” 2404419. WHEN USED AS A REPLACEMENT PART FOR: - FC200503 OR - FC200651 THE NEW CABLE (2404419) IS ALREADY IN USE	1	Y
1c	INTERNAL I/O BOARD	FC200889	USED WITH SCANNERS WITH PART NUMBER: FC000650, FC000699, FC000760, FC000770, FC000780, FC000790, FC000800, FC000810, FC000820, FC000830, FC000840, FC000850, FC000890, FC000900, FC000910, FC000920, FC000930, FC000940, FC000950, FC000960, FC000970, FC000980,	1	Y
1d	INTERNAL I/O BOARD	FC200893	REPLACES FC200695	1	N
	EXTERNAL I/O MODULE				
2	EXTERNAL I/O BOARD COMPLETE	FB200198		1	Y

Section 9-22
Peripherals

9-22-1 Peripherals Compatibility

NOTE: *The tables below are include for your info. Even if a model is listed, it does not indicate if it is available as a service part (FRU).*

Table 9-46 Peripherals Compatibility - BT'06 (software v6.x)

TYPE	MAKE	DESIGNATION	PART NUMBER	V7 DIMENSION PAL	V7 DIMENSION NTSC	V7 PRO PAL	V7 PRO NTSC
DVD RECORDER (DVR)	JVC	JVC BD-X201ME	066E9530	X	X	X	X
VCR S-VHS	SONY	SVO9500MDP/2	066E9510	X		X	
	SONY	SVO9500MD/2	066E9511		X		X
B/W DIGITAL PRINTER	SONY	UP-D895MD 110/220V	066E0098	X	X	X	X
B/W DIGITAL PRINTER	SONY	UPD-897SYN	066E0111	X	X	X	X
COLOR DIGITAL PRINTER	SONY	UP-D23MD	066E2958	X	X	X	X

Table 9-47 Peripherals Compatibility - BT'04 and BT'05 (software v4.x and v5.x)

TYPE	MAKE	DESIGNATION	PART NUMBER	V7 DIMENSION PAL	V7 DIMENSION NTSC	V7 PRO PAL	V7 PRO NTSC
VCR S-VHS	SONY	SVO9500MDP/2	066E9510	X		X	
	SONY	SVO9500MD/2	066E9511		X		X
B/W DIGITAL PRINTER	SONY	UP-D895MD 110/220V	066E0098	X	X	X	X
COLOR DIGITAL PRINTER	SONY	UP-D23MD	066E2958	X	X	X	X

9-22-1 Peripherals Compatibility (cont'd)

Table 9-48 Peripherals Compatibility - BT'03 (software v3.x)

TYPE	MAKE	DESIGNATION	PART NUMBER	V7 BT03 PAL	V7 BT03 NTSC	V7 BT03 PRO PAL	V7 BT03 PRO NTSC	V7 RFI PAL	V7 RFI NTSC	V7 PRO RFI PAL	V7 PRO RFI NTSC
VCR S-VHS	SONY	SVO9500MDP/2	066E9510	X		X		X		X	
	SONY	SVO9500MD/2	066E9511		X		X		X		X
	PANASONIC	AG-MD835E	066E0836	(X)		(X)		(X)		(X)	
	PANASONIC	AG-MD835P	066E0835		(X)		(X)		(X)		(X)
B/W VIDEO PRINTER	SONY	UP895MDW 110/220V	066E0088								
B/W DIGITAL PRINTER	SONY	UP-D895MD 110/220V	066E0098	X	X	X	X	X	X	X	X
COLOR VIDEO PRINTER	SONY	UP2800P 220V	066E2800								
	SONY	UP2950MD 100/220V	066E2950								
	SONY	UP-21MD	066E2955								
COLOR DIGITAL PRINTER	SONY	UP-D21MD	066E2957	X	X	X	X	X	X	X	X

Table 9-49 Peripherals Compatibility - BT'01 and BT'02 (software v2.x)

TYPE	MAKE	DESIGNATION	PART NUMBER	V7 PAL	V7 NTSC	V7 BT02 PAL	V7 BT02 NTSC	V7 PRO PAL	V7 PRO NTSC
VCR S-VHS	SONY	SVO9500MDP/2	066E9510			X		X	
	SONY	SVO9500MD/2	066E9511				X		X
	PANASONIC	AG-MD835E	066E0836	X		(X)		(X)	
	PANASONIC	AG-MD835P	066E0835		X		(X)		(X)
B/W VIDEO PRINTER	SONY	UP895MDW 110/220V	066E0088	X	X	X	X	X	X
B/W DIGITAL PRINTER	SONY	UP-D895MD 110/220V	066E0098						
COLOR VIDEO PRINTER	SONY	UP2800P 220V	066E2800	X					
	SONY	UP2950MD 100/220V	066E2950		X				
	SONY	UP-21MD	066E2955			X	X	X	X

Table 9-49 Peripherals Compatibility - BT'01 and BT'02 (software v2.x) (cont'd)

TYPE	MAKE	DESIGNATION	PART NUMBER	V7 PAL	V7 NTSC	V7 BT02 PAL	V7 BT02 NTSC	V7 PRO PAL	V7 PRO NTSC
COLOR DIGITAL PRINTER	SONY	UP-D21MD	066E2957						

9-22-2 Printers, Internal

Table 9-50 Printers, Internal

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	SONY UP2950MD	066E2950	PRINTER UP-2950MD (INCL.MAN) 100-220V, NTSC/PAL	1	Y
2	SONY PRINTER UP-D23MD	066E2958	COLOR PRINTER UP23MD May be used as replacement for 066E2957	1	Y
3	SONY PRINTER UP-D21MD	066E2957	DIGITAL COLOR PRINTER ASSEMBLY	1	Y
4	SONY UP-D895MD	066E0098	DIGITAL GRAPHIC B/W PRINTER	1	Y
5	SONY UP-D897SYN	066E0111	DIGITAL GRAPHIC B/W PRINTER	1	Y
6	SONY UP21MD	066E2955	COLOR PRINTER UP21MD	1	Y
7	PRINTER SONY UP-895MDW	2288502	SONY B/W VIDEO PRINTER	1	Y

9-22-3 Network Printers

Table 9-51 Network Printers

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	COLOR LASER PRINTER 100-127 VAC, ASSEMBLY -SPARE PART:	EP100910 066E0418		1	Y
	COLOR LASER PRINTER 220-240 VAC, ASSEMBLY -SPARE PART:	EP100912 066E0419			
0	NETWORK PRINTER ASSEMBLY HP OfficeJet PRO K550dtn	066E0425		1	Y
1	NETWORK PRINTER ASSEMBLY HP1200dtn	EP100731		1	Y
2	HP DESKJET 6127, 100-240VAC	066E0414	NETWORK COLOR PRINTER	1	Y
3	LEXMARK C762N PRINTER, 100V PC	EP100501/ 066E0432	NETWORK COLOR LASER PRINTER REPLACES C750N AND C752N 	1	Y
4	LEXMARK C762N PRINTER, 230V PC	EP100498/ 066E0431		1	Y
5	LEXMARK C762N PRINTER, 110V PC	EP100497/ 066E0430		1	Y
6	LEXMARK C750N PRINTER, 110V PC	066E0430	NETWORK COLOR LASER PRINTER	1	Y
7	LEXMARK C750N PRINTER, 220V PC	066E0431	NETWORK COLOR LASER PRINTER	1	Y
8	HP JETDIRECT 175X, 230V	066E0408	NETWORK INTERFACE, USED WITH HP DESKJET 990CXI	1	Y
9	HP JETDIRECT 175X, 110V	066E0409	NETWORK INTERFACE, USED WITH HP DESKJET 990CX		
10	HP DESKJET 990CXI, 100/240V	066E0407	NETWORK PRINTER	1	Y

9-22-4 Digital Video Disc Recorder (DVR)

Table 9-52 DVD Recorder used on Vivid 7 (Introduced BT’06)

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	JVC BD-X201ME	066E9530	JVC DVD VIDEO RECORDER	1	Y

9-22-5 Video Cassette Recorders (VCRs)

Table 9-53 VCRs used on Vivid 7

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VCR MITSUBISHI HS-MD3000E	066E9513	VCR MITSUBISHI HS-MD3000E SVHS RS-232C PAL VERSION Additional mounting bracket needed if used as replacement for 066E9510 or 066E9511.	1	Y
2	VCR MITSUBISHI HS-MD3000U	066E9514	VCR MITSUBISHI HS-MD3000E SVHS RS-232C NTSC VERSION Additional mounting bracket needed if used as replacement for 066E9510 or 066E9511.		Y
3	Analog VCR PAL	066E9510	SONY SVO9500MDP2 SUPER-VHS, PAL Needs software V2.0 (BT’02) or higher		Y
4	Analog VCR NTSC	066E9511	SONY SVO9500MD SUPER-VHS, NTSC Needs software V2.0 (BT’02) or higher		Y

9-22-6 USB Flash Card (USB Drive)

Table 9-54 USB Flash Card (USB Drive)

ITEM	Part Name	Part Number	Description	QTY	FRU
1	USB Drive 256 MB USB 2.0 The following models have been approved for use with Vivid 7:. - Kingston DataTraveler Elite 256 MB - Sandisk Cruzer Micro 256 MB - Twin MOS K24-256MB Mobile Disk III - JMTek	066E0693 066E0692 066E0691 066E0690	USB FLASH CARD (USB Drive 256 MB USB 2.0)	1	N

9-22-7 Footswitch

Table 9-55 Footswitch

ITEM	Part Name	Part Number	Description	QTY	FRU
1	Footswitch	FB200952	FOOTSWITCH 3-PEDALS IP68 - SAME AS LOGIQ 7 & LOGIQ 9 -	1	Y

9-22-8 Modem Option

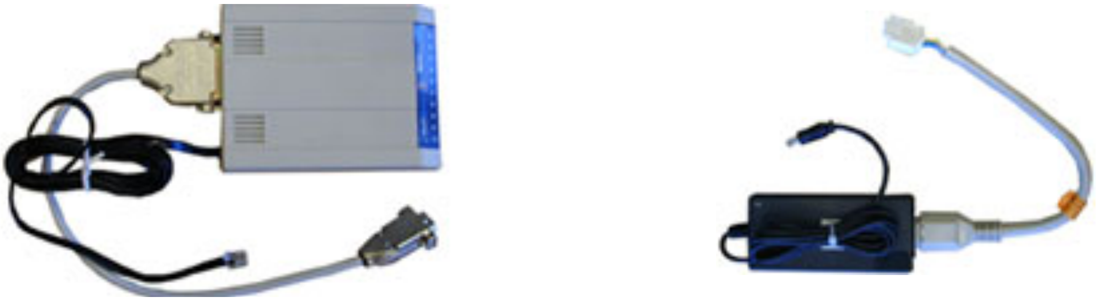
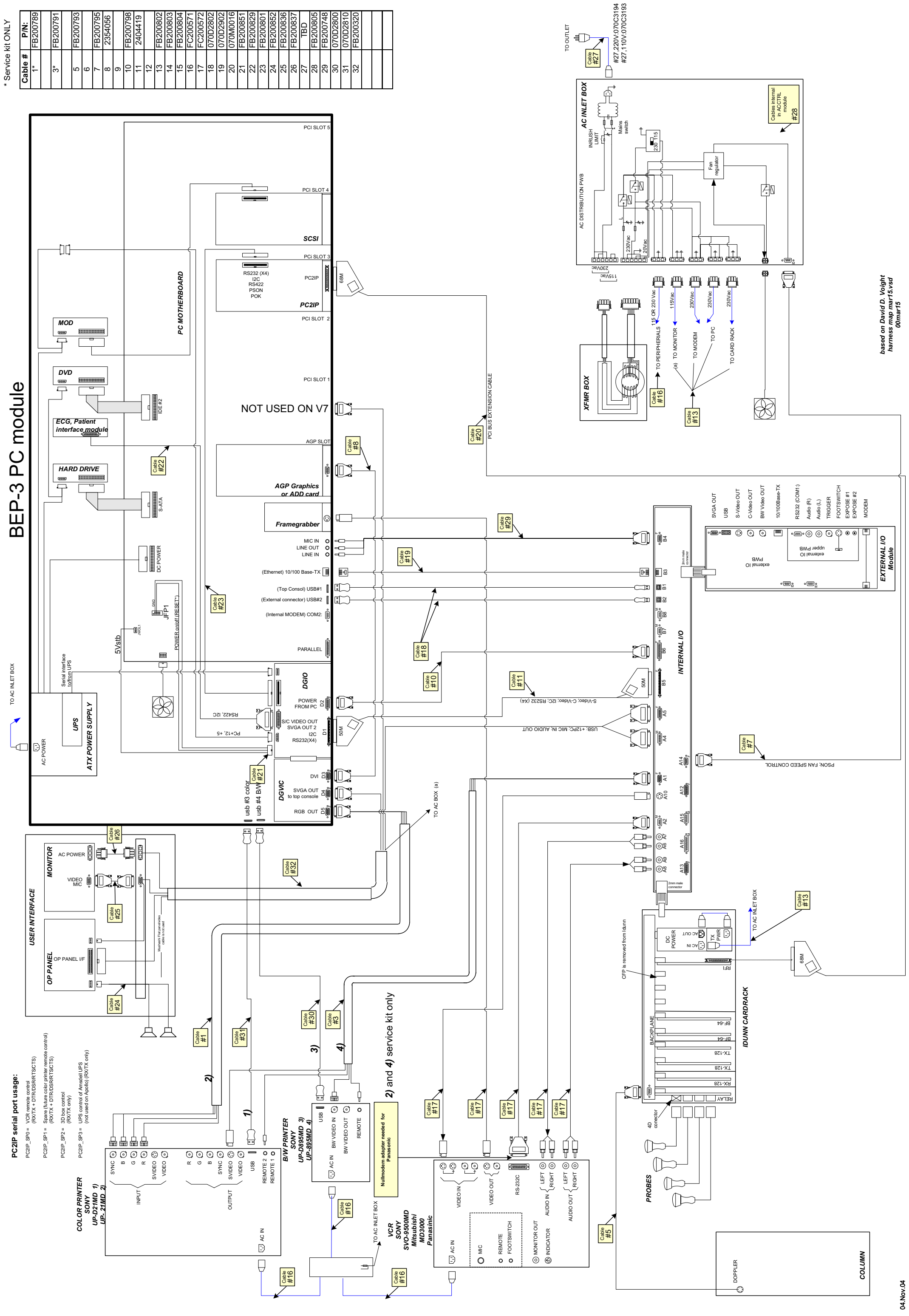


Figure 9-30 Modem with AC Converter and Cables

Table 9-56 Modem option

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	MODEM (MULTITECH) NEW GLOBAL	2245794		1	Y

Section 9-23
Cables - Vivid 7


BEP-3 PC module
PC MOTHERBOARD
PCI SLOT 5
PCI SLOT 4
SCSI
PCI SLOT 3
PC2IP
RS232 (X4)
I2C
RS422
PSON
POK
PCI SLOT 2
PCI SLOT 1
NOT USED ON V7
AGP SLOT
AGP Graphics or ADD card
Framegrabber
MIC IN
LINE OUT
LINE IN
(Ethernet) 10/100 Base-TX
(Top Consol) USB#1
(External connector) USB#2
(Internal MODEM) COM2:
PARALLEL
DGIO
POWER FROM PC
S/C VIDEO OUT
SVGA OUT 2
I2C
RS232(X4)
DGVIC
DVI
SVGA OUT to top console
RGB OUT
MOD
DVD
ECG, Patient interface module
HARD DRIVE
IDE #2
S-ATA
DC POWER
JP1
POWER on/off (RESET)
5Vstb
UPS
ATX POWER SUPPLY
AC POWER
Serial interface to/from UPS
TO AC INLET BOX
RS422, I2C
PC+12, +5
usb #3 color
usb #4 B/W
USER INTERFACE
MONITOR
AC POWER
VIDEO
MIC
OP PANEL
OP PANEL I/F
Cable #1
Cable #3
Cable #5
Cable #7
Cable #8
Cable #10
Cable #11
Cable #13
Cable #16
Cable #17
Cable #18
Cable #19
Cable #20
Cable #21
Cable #22
Cable #23
Cable #24
Cable #25
Cable #26
Cable #27
Cable #28
Cable #29
Cable #30
Cable #31
Cable #32
PCI BUS EXTENSION CABLE
TO OUTLET
#27 220V:070C3194
#27 110V:070C3193
AC INLET BOX
AC DISTRIBUTION PWB
INRUSH LIMIT
Mains switch
Fan regulator
Cables internal in AC CTRL module
115Vac
230Vac
XFMR BOX
TO PERIPHERALS
TO MONITOR
TO MODEM
TO PC
TO CARD RACK
115 OR 230 Vac
based on David D. Voight harness map mar15.vsd 00mar15
SVGA OUT
USB
S-Video OUT
C-Video OUT
BW Video OUT
10/100Base-TX
RS232 (COM1)
Audio (R)
Audio (L)
TRIGGER
FOOTSWITCH
EXPOSE #1
EXPOSE #2
MODEM
EXTERNAL I/O Module
external IO upper PWB
external IO PWB
INTERNAL I/O
S-Video, C-Video, I2C, RS232 (X4)
USB, +12PC, MIC IN, AUDIO OUT
PSON, FAN SPEED CONTROL
TO AC BOX
IDUNN CARDRACK
BACKPLANE
CFP is removed from Idunn
DC POWER
AC OUT
AC IN
TX PWR
RFI
BF-64
TX-128
RX-128
RELAY
TO AC INLET BOX
4D connector
PROBES
COLUMN
DOPPLER
PC2IP serial port usage:
PC2IP_SP0 = VCR remote control (RX/TX + DTR/DSR/RTS/CTS)
PC2IP_SP1 = Spare (future color printer remote control) (RX/TX + DTR/DSR/RTS/CTS)
PC2IP_SP2 = 3D box control (RX/TX only)
PC2IP_SP3 = UPS control of Amadell UPS (not used on Apollo) (RX/TX only)
COLOR PRINTER SONY UP-D21MD 1) UP-21MD 2)
INPUT
OUTPUT
SYNC
SVIDEO
VIDEO
USB
REMOTE 2
REMOTE 1
AC IN
B/W PRINTER SONY UP-D895MD 3) UP-895MD 4)
BW VIDEO IN
BW VIDEO OUT
REMOTE
Nullmodem adapter needed for Panasonic
TO AC INLET BOX
VCR SONY SVO-9500MD Mitsubishi MD3000 Panasonic
VIDEO IN
VIDEO OUT
RS-232C
AUDIO IN
AUDIO OUT
LEFT
RIGHT
MIC
REMOTE
FOOTSWITCH
MONITOR OUT
INDICATOR
2) and 4) service kit only
04.Nov.04

* Service kit ONLY

Cable #	P/N:
1*	FB200789
3*	FB200791
5	FB200793
6	
7	FB200795
8	2354056
9	
10	FB200798
11	2404419
12	
13	FB200802
14	FB200803
15	FB200804
16	FC200571
17	FC200572
18	070D2802
19	070D2902
20	070M0016
21	FB200851
22	FB200829
23	FB200801
24	FB200852
25	FB200836
26	FB200837
27	TBD
28	FB200805
29	FB200748
30	070D2800
31	070D2810
32	FB200320

Figure 9-31 Vivid 7 w/ BEP3 & FEP2 Interconnect Cabling

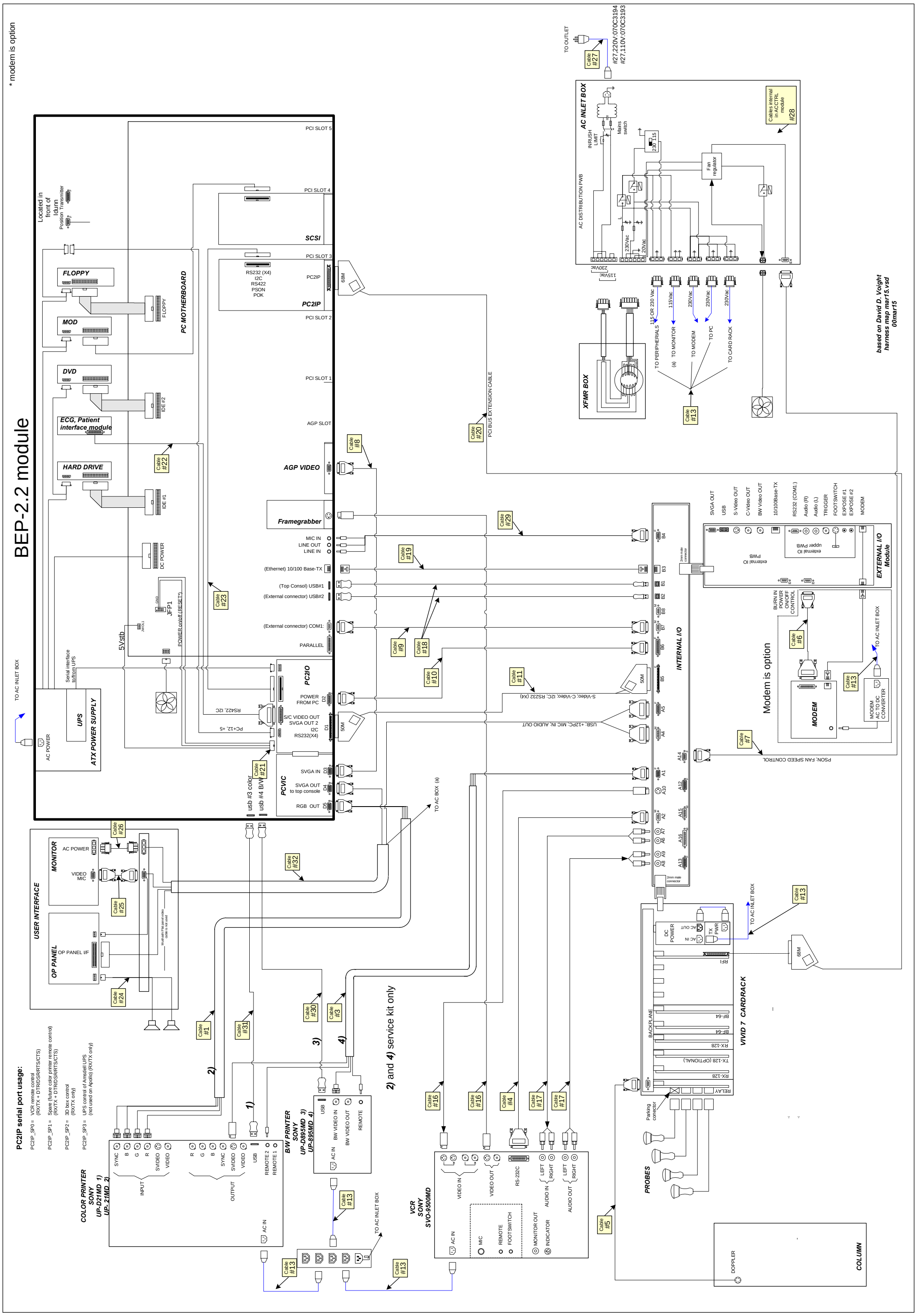

BEP-2.2 module
* modem is option
PC MOTHERBOARD
FLOPPY
MOD
DVD
ECG, Patient interface module
HARD DRIVE
UPS
ATX POWER SUPPLY
PCI SLOT 5
PCI SLOT 4
SCSI
PCI SLOT 3
PC2IP
PCI SLOT 2
PCI SLOT 1
AGP SLOT
AGP VIDEO
Framegrabber
PC2IO
PCVIC
USER INTERFACE
MONITOR
OP PANEL
INTERNAL I/O
EXTERNAL I/O Module
MODEM
Modem is option
AC INLET BOX
XFMR BOX
VIVID 7 CARDRACK
PROBES
COLUMN
COLOR PRINTER SONY UP-D21MD 1) UP-21MD 2)
B/W PRINTER SONY UP-D895MD 3) UP-895MD 4)
VCR SONY SVO-9500MD
2) and 4) service kit only
PC2IP serial port usage:
based on David D. Voight harness map mar15.vsd 00mar15
TO AC INLET BOX
TO OUTLET
#27,220V:070C3194
#27,110V:070C3193
Cable #1
Cable #3
Cable #4
Cable #5
Cable #6
Cable #7
Cable #8
Cable #9
Cable #10
Cable #11
Cable #13
Cable #16
Cable #17
Cable #18
Cable #19
Cable #20
Cable #21
Cable #22
Cable #23
Cable #24
Cable #25
Cable #26
Cable #27
Cable #28
Cable #29
Cable #30
Cable #31
Cable #32

Figure 9-32 Vivid 7 w/ BEP2.2 & FEP2 Interconnect Cabling

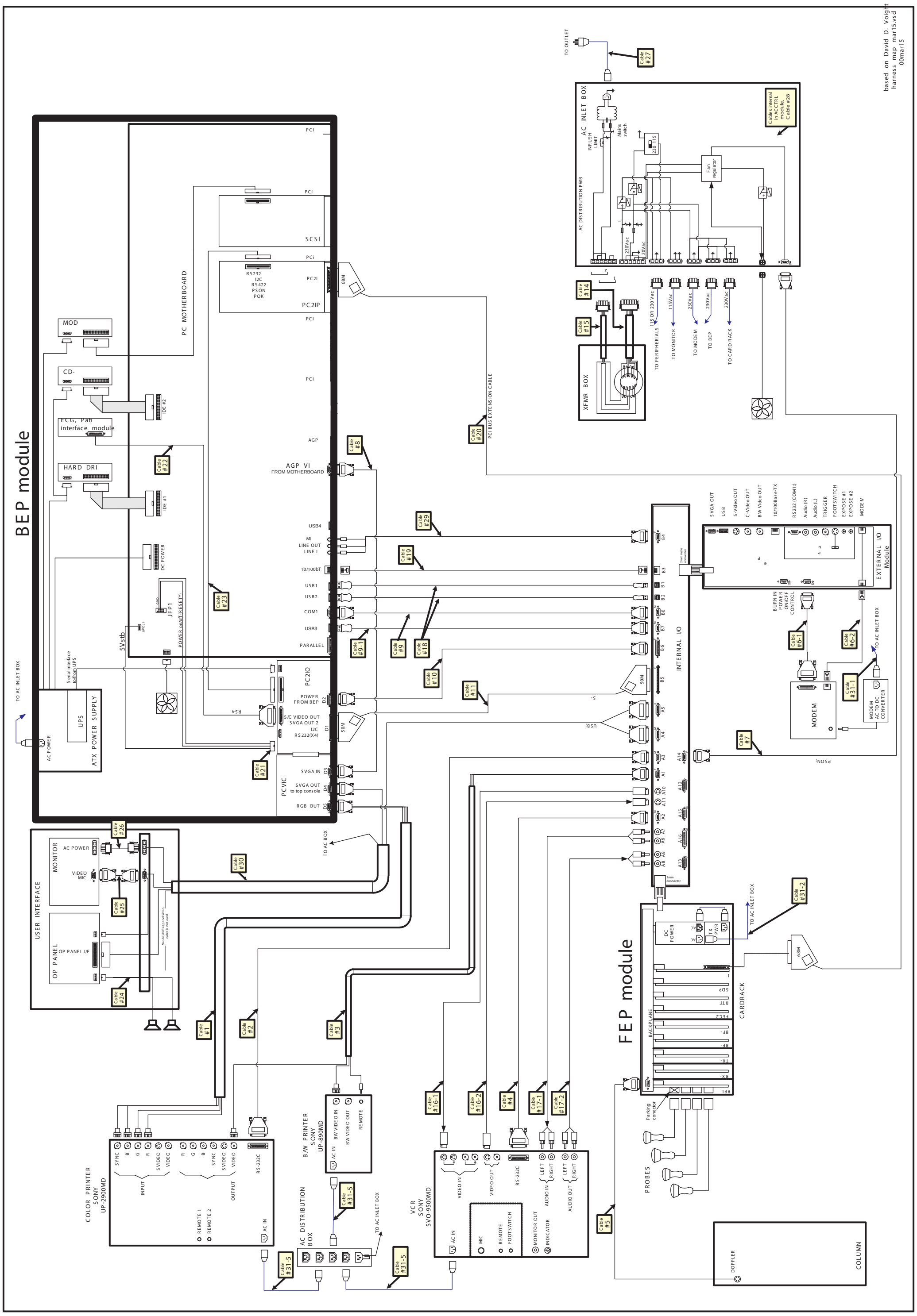

BEP module
FEP module
PC MOTHERBOARD
ATX POWER SUPPLY
UPS
AC POWER
USER INTERFACE
MONITOR
OP PANEL
INTERNAL I/O
EXTERNAL I/O Module
AC INLET BOX
XFMR BOX
MODEM
CARDRACK
BACKPLANE
PROBES
COLUMN
DOPPLER
COLOR PRINTER SONY UP-2900MD
B/W PRINTER SONY UP-890MD
AC DISTRIBUTION BOX
VCR SONY SVO-9500MD
PC2IO
PC2IP
PCVIC
SCSI
AGP VI
HARD DRI
CD-
MOD
ECG, Pati interface module
TO OUTLET
TO AC INLET BOX
TO PERIPHERALS
TO MONITOR
TO MODEM
TO BEP
TO CARD RACK
PCI BUS EXTENSION CABLE
Cable #1
Cable #2
Cable #3
Cable #4
Cable #5
Cable #6-1
Cable #6-2
Cable #7
Cable #8
Cable #9
Cable #9-1
Cable #10
Cable #11
Cable #14
Cable #15
Cable #16-1
Cable #16-2
Cable #17-1
Cable #17-2
Cable #18
Cable #19
Cable #20
Cable #21
Cable #22
Cable #23
Cable #24
Cable #25
Cable #26
Cable #27
Cable #29
Cable #30
Cable #31-1
Cable #31-2
Cable #31-5
based on David D. Voigt harness map mar15.vsd 00mar15

Figure 9-33 Vivid 7 w/ BEP2 (& FEP1) Interconnect Cabling

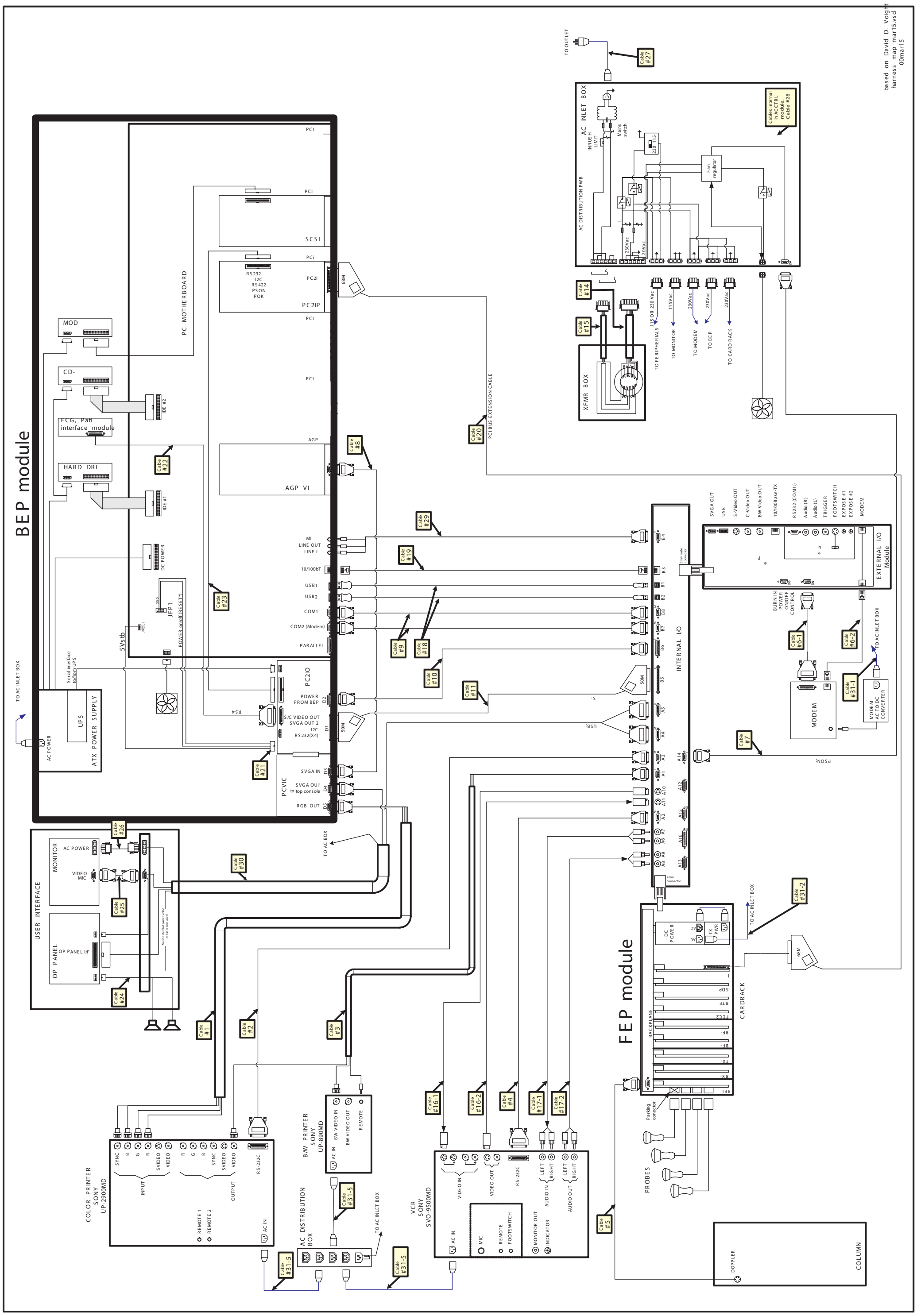

BEP module
PC MOTHERBOARD
SCSI
PC2IP
AGP VI
PC2IO
PCVIC
ATX POWER SUPPLY
UPS
USER INTERFACE
MONITOR
OP PANEL
AC INLET BOX
AC DISTRIBUTION PWB
XFMR BOX
INTERNAL I/O
EXTERNAL I/O Module
MODEM
FEP module
CARDRACK
PROBES
COLUMN
DOPPLER
COLOR PRINTER SONY UP-2900MD
B/W PRINTER SONY UP-890MD
VCR SONY SVO-9500MD
AC DISTRIBUTION BOX
TO OUTLET
TO AC INLET BOX
based on David D. Voight harness map mar15.vsd 00mar15

Figure 9-34 Vivid 7 w/ BEP1 Interconnect Cabling

Table 9-57 Cables sheet 1 of 5

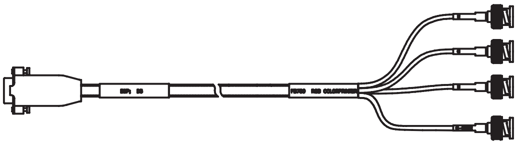
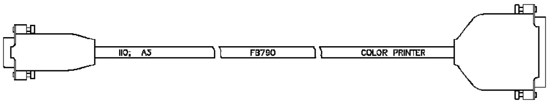
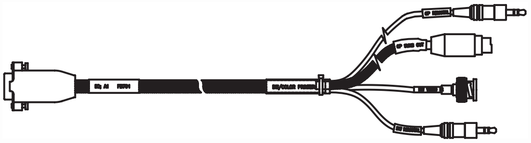
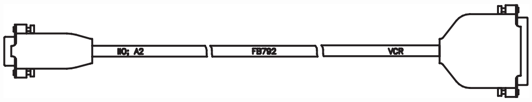
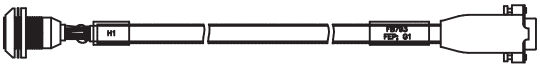
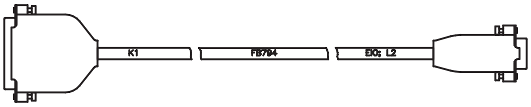
CABLE #	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CABLE COLOR PRINTER VIDEO	FB200789	VIDEO FROM PCVIC TO COLOR PRINTER BEP-D5 to RGB Color Printer 	1	Y
	CABLE USB A to B, 1.50 M		FOR DIGITAL COLOR PRINTER FROM C18 (ON BEP) TO USB ON DIGITAL COLOR PRINTER	1	N
2	CABLE COLOR PRINTER CTRL	FB200790	RS-232C (COMMANDS, CONTROL SIGNALS FROM OPERATOR PANEL) IIO-A3 to Color Printer (RS232)  	1	Y
3	CABLE BW/CP PRINTER	FB200791	IIO-A1 to BW/Color Printer 	1	Y
	CABLE USB, 1.0 M	070D2800	FOR DIGITAL B/W PRINTER FROM C19 (ON BEP) TO USB ON DIGITAL BW PRINTER)	1	Y
4	CABLE VCR REMOTE CTRL.	FB200792	Cable VCR remote Controller IIO-A2 to VCR  USED ON BT01, BT02 and BT03 SYSTEMS	1	Y
5	CABLE, DOPPLER	FB200793	Doppler Connector to FEP-G1  	1	Y
6-1	CABLE, STD. MODEM	FB200794	EIO-L2 -> Modem  	1	Y

Table 9-57 Cables (cont'd) sheet 2 of 5

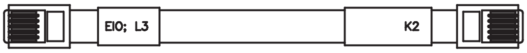
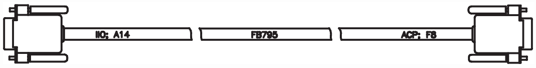
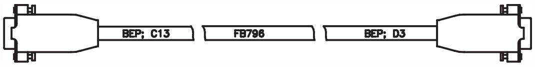
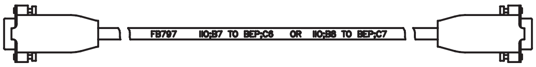
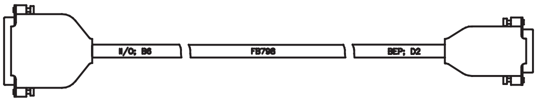
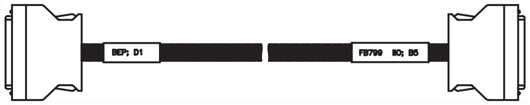
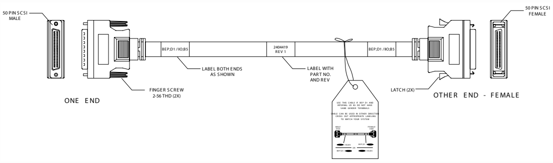
CABLE #	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
6-2	MODEM LINE CABLE	FC200032	EIO-L3 to Modem 	1	N
7	CABLE, FAN SPEED CTRL.	FB200795	Cable, Fan Speed Controller. IIO-A14 to ACP-F8  IIO; A14 FB795 ACP; F8	1	Y
8	CABLE, MON. STD. PCVIC-PC	FB200796	BEP-C13 to BEP-D3  BEP; C13 FB796 BEP; D3	1	Y
	CABLE, DVI 300MM LONG	2354056	BEP3: AGP to DGVIC-D3	1	Y
9	CABLE, RS232 COM 1/2	FB200797	IIO-B7 to BEP-C6 (BEP1) / IIO-B8 to BEP-C7  FB797 IIO;B7 TO BEP;C6 OR IIO;B8 TO BEP;C7	1 or 2, depending on V7 model	Y
9-1	NOT USED ON VIVID 7				
10	CABLE POWER/CTRL INT I/O PC2 I/O	FB200798	Cable, Power/Controller. Internal I/O-PC2IO IIO-B6 to BEP-D2  I/O; B6 FB798 BEP; D2	1	Y
11	CABLE, SIGNALS INT I/O-PC2IO	FB200799 or FC200286	Cable, Signals Internal I/O-PC2IO BEP-D1 to IIO-B5  BEP; D1 FB799 IIO; B5	1	Y
	CABLE, SIGNALS INT I/O-PC2IO	2404419	Cable, Signals Internal I/O-PC2IO BEP-D1 to IIO-B5 TO BE USED WITH FC200503 (IIO)  50 PIN SCSI MALE 50 PIN SCSI FEMALE BEP;D1 / IIO;B5 2404419 REV 1 BEP;D1 / IIO;B5 LABEL BOTH ENDS AS SHOWN LABEL WITH PART NO. AND REV FINGER SCREW 2-56 THD (2X) LATCH (2X) ONE END OTHER END - FEMALE USE THIS CABLE IF BEP D1 AND INTERNAL I/O B5 DO NOT HAVE SAME GENDER TERMINALS CABLE CAN BE USED IN EITHER DIRECTION CROSS OUT APPROPRIATE LABELING TO MATCH YOUR SYSTEM MALE END FEMALE END	1	Y
12	NOT USED ON Vivid 7				

Table 9-57 Cables (cont'd) sheet 3 of 5

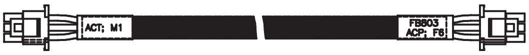
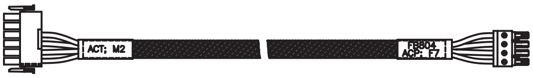
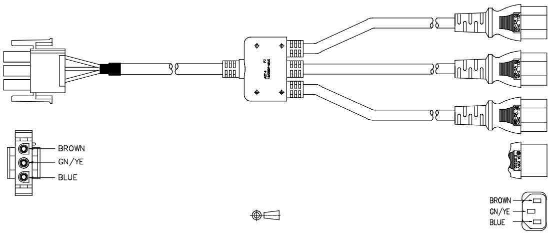
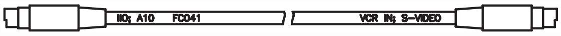
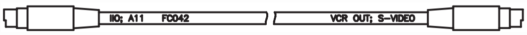
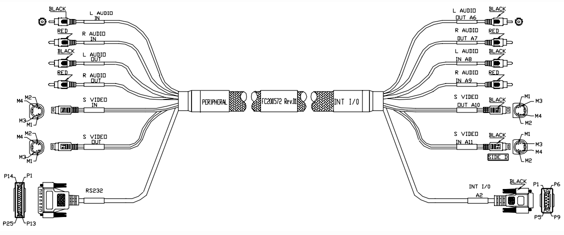
CABLE #	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
13	CABLE KIT-AC POWER CABLES	FB200802	AC POWER CABLES INSIDE SCANNER.	1	Y
	CABLE MAINS SHIELDED 0.3 M			1	PART OF KIT
	CABLE MAINS SHIELDED 0.5 M			1	
	CABLE MAINS SHIELDED 0.7 M			1	
	CABLE MAINS SHIELDED 0.8 M			1	
	CABLE MAINS SHIELDED 0.8 M			3	
14	CABLE, AC MAINS 1	FB200803 or FC200792	AC Transformer, ACT-M1 to AC Controller, ACP-F6  ACT; M1 FB803 ACP; F6	1	Y
15	CABLE, AC MAINS 2	FB200804 or FC200793	AC Transformer, ACT-M2 to AC Controller, ACP-F7  ACT; M2 FB804 ACP; F7	1	Y
16	CABLE, 3 HEADED AC POWER CABLE FOR PERHIPHERIAL	FC200571	 BROWN GN/YE BLUE BROWN GN/YE BLUE	1	Y
16-1	CABLE S-VIDEO 1	FC200041	IIO-A10 to VCR IN  IIO; A10 FC041 VCR IN; S-VIDEO	1	Y
16-2	CABLE S-VIDEO 2	FC200042	*BEP1 & BEP2:* IIO-A11 to VCR OUT *BEP2.2:* VIDEO GRABBER (BEP) to VCR OUT  IIO; A11 FC042 VCR OUT; S-VIDEO	1	Y
17	V7/L9 AUDIO CABLE	FC200572	BEP3.x: IIO - VCR *NOTE! A NULL MODEM ADAPTER IS NEEDED IF CONNECTED TO A PANASONIC VCR*  BLACK L AUDIO IN RED R AUDIO IN BLACK L AUDIO OUT RED R AUDIO OUT M4 M2 M3 M1 S VIDEO IN S VIDEO OUT P14 P1 P25 P13 RS232 PERIPHERAL FC200572 Rev.01 INT I/O L AUDIO OUT A6 BLACK R AUDIO OUT A7 RED L AUDIO IN A8 BLACK R AUDIO IN A9 RED S VIDEO OUT A10 BLACK S VIDEO IN A11 BLACK SIDE D INT I/O A2 BLACK P1 P6 P5 P9	1	Y

Table 9-57 Cables (cont'd) sheet 4 of 5

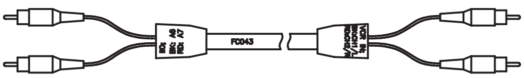
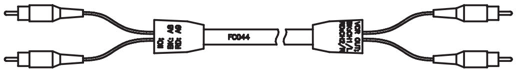
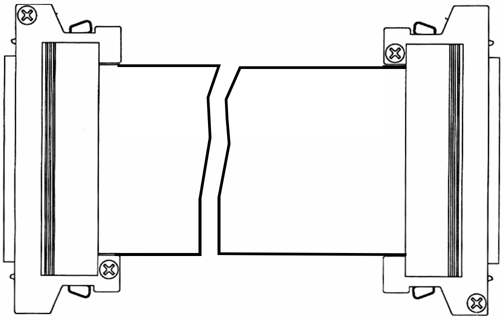
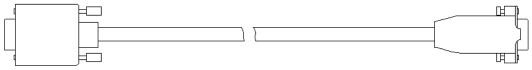
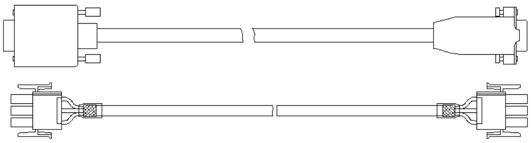
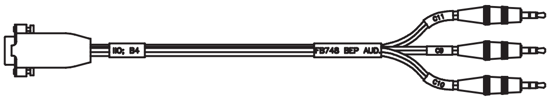
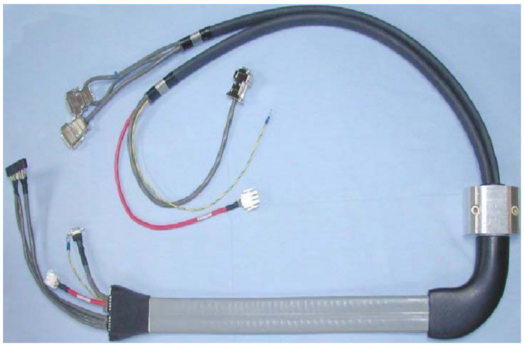
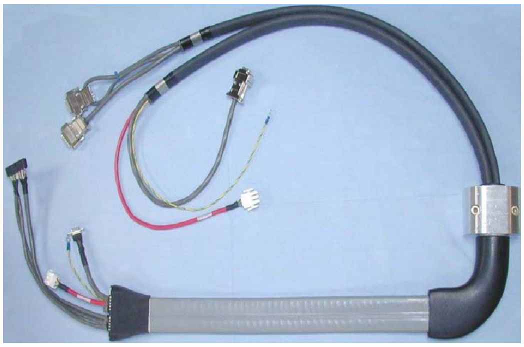
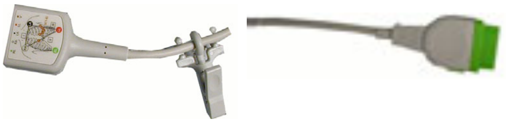
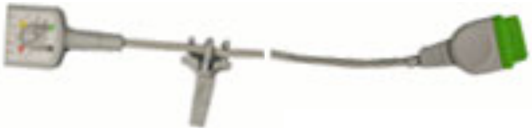
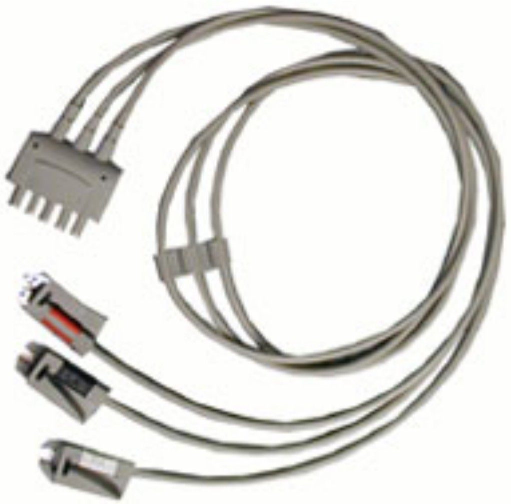
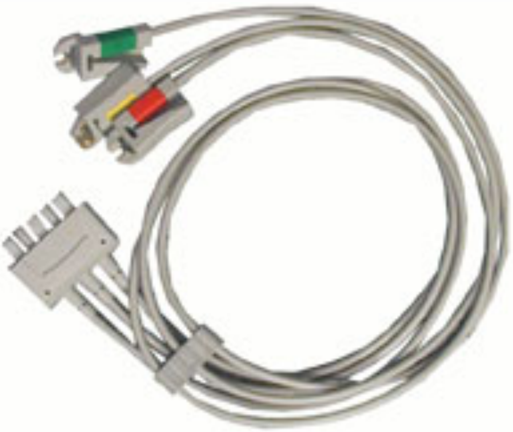
CABLE #	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
17-1	CABLE PHONO 1	FC200043	IIO-A6/A7 to VCR IN CH1(L)/CH2(R) 	1	Y
17-2	CABLE PHONO 2	FC200044	IIO-A8/A9 to VCR OUT CH1(L)/CH2(R) 	1	Y
18	CABLE, USB A-B	070D2802	Length: 0.25 meter (9.84 inch)	2	Y
19	CABLE, ETHERNET CAT-5	070D2902		1	Y
20	CABLE PCI, AMP 974298	070M0016	BEP-PCI slot to Card Rack-IP Module 	1	Y
	CORE FLATCABLE FERRIT W/LOCK	038X2050	USED WITH PCI CABLE	1	N
21 to 24	Part of other FRUs				
25	VGA MONITORCABLE 0.90M	070D2909	CABLE, MONITOR VGA 	1	Y
25/26	MONITOR CABLE ASSEMBLY	2304171	CABLE, MONITOR VGA + CABLE, MONITOR POWER 	1	Y
27	CABLE POWER 220V AC PLUG EU	070C3194		1	Y
	NORTH AMERICA POWER CORD	5148381		1	Y

Table 9-57 Cables (cont'd) sheet 5 of 5

CABLE #	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
28	CABLES INTERNAL IN AC DISTRIBUTION POWER BOX - PART OF AC DISTRIBUTION POWER BOX				
29	CABLE, AUDIO INTERNAL I/O-PC	FB200748	IIO-B4 to BEP-AUD 	1	Y
30	CABLE USB, 1.0 M	070D2800	FOR DIGITAL B/W PRINTER FROM C19 (ON BEP) TO USB ON DIGITAL BW PRINTER)	1	Y
30	CABLE, CONSOLE, ASSY COMPLETE	FB200320	Top Console and Monitor to IIO, AC CTRL, BEP and Gas Spring 	1	Y
31	CABLE, USB, 2 METER	070D2810	FOR DIGITAL COLOR PRINTER FROM BEP TO USB ON DIGITAL COLOR PRINTER	1	Y
INTERAL AC POWER CABLE KIT		FB200802	AC POWER CABLES INSIDE SCANNER, SEE DESCRIPTIONS FOR EACH CABLE BELOW.	1	Y
31-1	CABLE MAINS SHIELDED 0.3 M			1	PART OF KIT
31-2	CABLE MAINS SHIELDED 0.5 M			1	
31-3	CABLE MAINS SHIELDED 0.7 M			1	
31-4	CABLE MAINS SHIELDED 0.8 M			1	
31-5	CABLE MAINS SHIELDED 0.8 M			3	
32	CABLE, CONSOLE, ASSY COMPLETE	FB200320	Top Console and Monitor to IIO, AC CTRL, BEP and Gas Spring 	1	Y
33	MAIN CABLE KIT	FD200043	FB200320 PLUSS WIRE ASSEMBLY	1	Y

Section 9-24
ECG Cables

Table 9-58 ECG Cables

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CABLE ECG MARQ. AHA/AMERICA	164L0025		1	Y
2	CABLE ECG MARQ. IEC / EU + AS	164L0026		1	Y
3	LEADWIRES ECG MARQ. AHA/AMERICA	164L0027		1	Y
4	LEADWIRES ECG MARQ. IEC/EU+AS	164L0028		1	Y

Section 9-25
Physio TX Parts

Table 9-59 Physio TX Parts

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	Heart Sound Microphone	FB200144	PHONO MICR. REDEL CONN. (4 pin connector) HCAT#: H4830JE	1	Y
2	Pulse Pressure Transducer	FB200147	(5 pin connector) HCAT#: H4830JG	1	N
	Adapter for MA300 heartmicrophone	FC200658		1	N
	Adapter Redel plug - Jack socket	FC200977		1	N

Section 9-26
Probes

9-26-1 Contents in this Section

- 9-26-2 "Supported Probes and Software Versions - BT'08" on page 9-80.
- 9-26-3 "Supported Probes and Software Versions - BT'06" on page 9-82.
- 9-26-4 "Supported Probes and Software Versions - BT'05" on page 9-84.
- 9-26-5 "Supported Probes and Software Versions - BT'04" on page 9-86.
- 9-26-6 "Supported Probes and Software Versions - BT'01, BT'02 and BT'03" on page 9-88.

9-26-2 Supported Probes and Software Versions - BT'08

Table 9-60 Supported Probes and Software Versions - BT'08 sheet 1 of 3

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'08 DIMENSION with 4D	BT'08 DIMENSION without 4D	BT'08 PRO
SECTOR PROBE						
3S	H4701SZ	2323337	3S COMFORT SCAN SECTOR PROBE 1.5 - 3.6 MHz	v7.x	v7.x	v7.x
M3S	H45011SZ	2295649	M3S AMA SECTOR PROBE 1.5 - 4.3 MHz	v7.x	v7.x	N/A
M4S	H4000PA	5132742	M4S SECTOR PROBE 1.5 - 4.3 MHz	v7.x	v7.x	N/A
5S	H440422LA	2347469	5S COMFORT-SCAN SECTOR PROBE 2.2 - 5.0 MHz	v7.x	v7.x	v7.x
7S	H40422LB	2347471	7S COMFORT-SCAN SECTOR PROBE 3.0 - 8.0 MHz	v7.x	v7.x	v7.x
10S	H4901PC	2298589	10 S SECTOR PROBE 4.0 - 12.0 MHz	v7.x	v7.x	v7.x
TEE						
6T-OR rev J	H45551BG	KN100076	PROBE TEE 6T 2.9 - 6.7 MHz	v7.x	v7.x	v7.x
6T-OR	H45521DX	KN100092	PROBE TEE 6T 2.9 - 6.7 MHz	v7.x	v7.x	v7.x
6T	H45001YD	KN100068	PROBE TEE 6T 2.9 - 6.7 MHz	v7.x	v7.x	v7.x
6T	H45001YD	KN100022	PROBE TEE 6T 2.9 - 6.7 MHz	v7.x	v7.x	v7.x
6T	H45531HW	KN100069	PROBE TEE 6T FOR JAPAN 2.9 - 6.7 MHz	v7.x	v7.x	v7.x

Table 9-60 Supported Probes and Software Versions - BT'08 (cont'd) sheet 2 of 3

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'08 DIMENSION with 4D	BT'08 DIMENSION without 4D	BT'08 PRO
9T	H45521DY	KN100072	PROBE, PEDIATRIC MPTEE 9T 3-3 - 10.0 MHz	v7.x	v7.x	v7.x
6Tv + ADAPTER	H45011AA H45001YF	KN100062 KZ200476	PROBE, TEE 2.9 - 6.7 MHz Adapter for use on Vivid 7	v7.x	v7.x	v7.x
LINEAR & CONVEX & OTHER						
7L	H40412LF	2294521	7L LINEAR PROBE TYPE (EXP) 2.2 - 8.0 MHz	v7.x	v7.x	v7.x
9L	H40412LT	5149427	9L LINEAR PROBE TYPE (EXP) 2.3 - 10.0 MHz	v7.x	v7.x	v7.x
10L	H40412LG	2294523	10L LINEAR PROBE TYPE (EXP) 4.0 - 10.0 MHz	v7.x	v7.x	v7.x
12L	H40412LH	2295377	12L LINEAR PROBE TYPE (EXP) 4.9 - 13 MHz	v7.x	v7.x	v7.x
M7C	H40412LC	2294514	M7C MIH PROBE 2.9 - 7.0 MHz	v7.x	v7.x	v7.x
M12L	H40412LD	2294511	M12L MIH PROBE 4.9 - 14 MHz	v7.x	v7.x	v7.x
3.5C	H4901PE	2050357	3.5C CONVEX PROBE 2.0 - 5.0 MHz	v7.x	v7.x	v7.x
4C	H4904PC	5123455	4C CONVEX PROBE TYPE (EXP) 1.6 - 5.0 MHz	v7.x	v7.x	v7.x
5C	H40412LA	2294516	5C CONVEX PROBE TYPE (EXP) 3.0 - 6.7 MHz	v7.x	v7.x	v7.x
E8C	H40412LE	2294641	E8C PROBE 3.7 - 8 MHz	v7.x	v7.x	v7.x
8C	H40412LJ	2348094	8C PROBE 3.7 - 8 MHz	v7.x	v7.x	v7.x
INTRAOPERATIVE						
i8L	H45511NW	KQ100006	I8L INTRAOPERATIVE PROBE 3.9 - 10.0 MHz	v7.x	v7.x	v7.x
i13L	H45511NT	KW100011	i13L INTRAOP.PROBE 5.3 - 14.0 MHz	v7.x	v7.x	v7.x
PENCIL (DOPPLER)						
2D (P2D)	H4830JE	TE100024	"PEDOF" DOPPLER PROBE - 2 MHz	v7.x	v7.x	v7.x

Table 9-60 Supported Probes and Software Versions - BT'08 (cont'd) sheet 3 of 3

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'08 DIMENSION with 4D	BT'08 DIMENSION without 4D	BT'08 PRO
6D (P6D)	H4830JG	TQ100002	"PEDOF" DOPPLER PROBE - 6 MHz 5.0 / 5.8 MHz	v7.x	v7.x	v7.x
REAL TIME 3D (4D)						
3V	H4900PC	5124295	4D Probe 1.5 - 4.0 MHz	v7.x	N/A	N/A

9-26-3 Supported Probes and Software Versions - BT'06

Table 9-61 Supported Probes and Software Versions - BT'06 sheet 1 of 3

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'06 DIMENSION with 4D	BT'06 DIMENSION without 4D	BT'06 PRO
SECTOR PROBE						
3S	H4701SZ	2323337	3S COMFORT SCAN SECTOR PROBE 1.5 - 3.6 MHz	v6.x	v6.x	v6.x
M3S	H45011SZ	2295649	M3S AMA SECTOR PROBE 1.5 - 4.3 MHz	v6.x	v6.x	N/A
M4S	H4000PA	5132742	M4S SECTOR PROBE 1.5 - 4.3 MHz	v6.x	v6.x	N/A
5S	H440422LA	2347469	5S COMFORT-SCAN SECTOR PROBE 2.2 - 5.0 MHz	v6.x	v6.x	v6.x
7S	H40422LB	2347471	7S COMFORT-SCAN SECTOR PROBE 3.0 - 8.0 MHz	v6.x	v6.x	v6.x
10S	H4901PC	2298589	10 S SECTOR PROBE 4.0 - 12.0 MHz	v6.x	v6.x	v6.x
TEE						
6T-OR	H45521DX	KN100092	PROBE TEE 6T 2.9 - 6.7 MHz	v6.x	v6.x	v6.x
6T	H45001YD	KN100068	PROBE TEE 6T 2.9 - 6.7 MHz	v6.x	v6.x	v6.x
6T	H45001YD	KN100022	PROBE TEE 6T 2.9 - 6.7 MHz	v6.x	v6.x	v6.x
6T	H45531HW	KN100069	PROBE TEE 6T FOR JAPAN 2.9 - 6.7 MHz	v6.x	v6.x	v6.x
9T	H45521DY	KN100072	PROBE, PEDIATRIC MPTEE 9T 3-3 - 10.0 MHz	v6.x	v6.x	v6.x

Table 9-61 Supported Probes and Software Versions - BT'06 (cont'd) sheet 2 of 3

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'06 DIMENSION with 4D	BT'06 DIMENSION without 4D	BT'06 PRO
6Tv + ADAPTER	H45011AA H45001YF	KN100062 KZ200476	PROBE, TEE 2.9 - 6.7 MHz Adapter for use on Vivid 7	v6.x	v6.x	v6.x
LINEAR & CONVEX & OTHER						
7L	H40412LF	2294521	7L LINEAR PROBE TYPE (EXP) 2.2 - 8.0 MHz	v6.x	v6.x	v6.x
9L	H40412LT	5149427	9L LINEAR PROBE TYPE (EXP) 2.3 - 10.0 MHz	v6.x	v6.x	v6.x
10L	H40412LG	2294523	10L LINEAR PROBE TYPE (EXP) 4.0 - 10.0 MHz	v6.x	v6.x	v6.x
12L	H40412LH	2295377	12L LINEAR PROBE TYPE (EXP) 4.9 - 13 MHz	v6.x	v6.x	v6.x
M7C	H40412LC	2294514	M7C MIH PROBE 2.9 - 7.0 MHz	v6.x	v6.x	v6.x
M12L	H40412LD	2294511	M12L MIH PROBE 4.9 - 14 MHz	v6.x	v6.x	v6.x
3.5C	H4901PE	2050357	3.5C CONVEX PROBE 2.0 - 5.0 MHz	v6.x	v6.x	v6.x
4C	H4904PC	5123455	4C CONVEX PROBE TYPE (EXP) 1.6 - 5.0 MHz	v6.x	v6.x	v6.x
5C	H40412LA	2294516	5C CONVEX PROBE TYPE (EXP) 3.0 - 6.7 MHz	v6.x	v6.x	v6.x
E8C	H40412LE	2294641	E8C PROBE 3.7 - 8 MHz	v6.x	v6.x	v6.x
8C	H40412LJ	2348094	8C PROBE 3.7 - 8 MHz	v6.x	v6.x	v6.x
INTRAOPERATIVE						
i8L	H45511NW	KQ100006	I8L INTRAOPERATIVE PROBE 3.9 - 10.0 MHz	v6.x	v6.x	v6.x
i13L	H45511NT	KW100011	i13L INTRAOP.PROBE 5.3 - 14.0 MHz	v6.x	v6.x	v6.x
PENCIL (DOPPLER)						
2D (P2D)	H4830JE	TE100024	"PEDOF" DOPPLER PROBE - 2 MHz	v6.x	v6.x	v6.x
6D (P6D)	H4830JG	TQ100002	"PEDOF" DOPPLER PROBE - 6 MHz 5.0 / 5.8 MHz	v6.x	v6.x	v6.x
REAL TIME 3D (4D)						

Table 9-61 Supported Probes and Software Versions - BT'06 (cont'd) sheet 3 of 3

				SUPPORTED MODELS & SW VERSION		
PROBES	CAT NO.	PART NUMBER	NAME	BT'06 DIMENSION with 4D	BT'06 DIMENSION without 4D	BT'06 PRO
3V	H4900PC	5124295	4D Probe 1.5 - 4.0 MHz	v6.x	N/A	N/A

9-26-4 Supported Probes and Software Versions - BT'05

Table 9-62 Supported Probes and Software Versions - BT'05 sheet 1 of 2

				SUPPORTED MODELS & SW VERSION		
PROBES	CAT NO.	PART NUMBER	NAME	BT'05 DIMENSION with 4D	BT'05 DIMENSION without 4D	BT'05 PRO
SECTOR PROBE						
3S	H4701SZ	2323337	3S COMFORT SCAN SECTOR PROBE 1.5 - 3.6 MHz	V5.x	V5.x	V5.x
M3S	H45011SZ	2295649	M3S AMA SECTOR PROBE 1.5 - 4.3 MHz	V5.x	V5.x	N/A
M4S	H4000PA	5132742	M4S SECTOR PROBE 1.5 - 4.3 MHz	V5.x	V5.x	N/A
5S	H440422LA	2347469	5S COMFORT-SCAN SECTOR PROBE 2.2 - 5.0 MHz	V5.x	V5.x	V5.x
7S	H40422LB	2347471	7S COMFORT-SCAN SECTOR PROBE 3.0 - 8.0 MHz	V5.x	V5.x	V5.x
10S	H4901PC	2298589	10 S SECTOR PROBE 4.0 - 12.0 MHz	V5.x	V5.x	V5.x
TEE						
5T + ADAPTER	H45001YF	KZ200476	PROBE TEE 5T 2.9 - 6.7 MHz Adapter for use on Vivid 7	v5.x	v5.x	v5.x
6T-OR	H45521DX	KN100092	PROBE TEE 6T 2.9 - 6.7 MHz	V5.x	V5.x	V5.x
6T	H45001YD	KN100068	PROBE TEE 6T 2.9 - 6.7 MHz	V5.x	V5.x	V5.x
6T	H45001YD	KN100022	PROBE TEE 6T 2.9 - 6.7 MHz	V5.x	V5.x	V5.x
6T	H45531HW	KN100069	PROBE TEE 6T FOR JAPAN 2.9 - 6.7 MHz	V5.x	V5.x	V5.x
9T	H45521DY	KN100072	PROBE, PEDIATRIC MPTEE 9T 3-3 - 10.0 MHz	V5.x	V5.x	V5.x

Table 9-62 Supported Probes and Software Versions - BT'05 (cont'd) sheet 2 of 2

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'05 DIMENSION with 4D	BT'05 DIMENSION without 4D	BT'05 PRO
6Tv + ADAPTER	H45011AA H45001YF	KN100062 KZ200476	PROBE, TEE 2.9 - 6.7 MHz PAMPTE Probe Adapter for use on Vivid 7	V5.x	V5.x	V5.x
LINEAR & CONVEX & OTHER						
7L	H40412LF	2294521	7L LINEAR PROBE TYPE (EXP) 2.2 - 8.0 MHz	V5.x	V5.x	V5.x
10L	H40412LG	2294523	10L LINEAR PROBE TYPE (EXP) 4.0 - 10.0 MHz	V5.x	V5.x	V5.x
12L	H40412LH	2295377	12L LINEAR PROBE TYPE (EXP) 4.9 - 13 MHz	V5.x	V5.x	V5.x
M7C	H40412LC	2294514	M7C MIH PROBE 2.9 - 7.0 MHz	V5.x	V5.x	V5.x
M12L	H40412LD	2294511	M12L MIH PROBE 4.9 - 14 MHz	V5.x	V5.x	V5.x
3.5C	H4901PE	2050357	3.5C CONVEX PROBE 2.0 - 5.0 MHz	V5.x	V5.x	V5.x
4C	H4904PC	5123455	4C CONVEX PROBE TYPE (EXP) 1.6 - 5.0 MHz	V5.x	V5.x	V5.x
5C	H40412LA	2294516	5C CONVEX PROBE TYPE (EXP) 3.0 - 6.7 MHz	V5.x	V5.x	V5.x
E8C	H40412LE	2294641	E8C PROBE 3.7 - 8 MHz	V5.x	V5.x	V5.x
8C	H40412LJ	2348094	8C PROBE 3.7 - 8 MHz	V5.x	V5.x	V5.x
INTRAOPERATIVE						
i8L	H45511NW	KQ100006	I8L INTRAOPERATIVE PROBE 3.9 - 10.0 MHz	V5.x	V5.x	V5.x
i13L	H45511NT	KW100011	i13L INTRAOP.PROBE 5.3 - 14.0 MHz	V5.x	V5.x	V5.x
PENCIL (DOPPLER)						
2D (P2D)	H4830JE	TE100024	"PEDOF" DOPPLER PROBE - 2 MHz	V5.x	V5.x	V5.x
6D (P6D)	H4830JG	TQ100002	"PEDOF" DOPPLER PROBE - 6 MHz 5.0 / 5.8 MHz	V5.x	V5.x	V5.x
REAL TIME 3D (4D)						
3V	H4900PC	5124295	4D Probe 1.5 - 4.0 MHz	V5.x	N/A	N/A

9-26-5 Supported Probes and Software Versions - BT'04

Table 9-63 Supported Probes and Software Versions - BT'04 sheet 1 of 2

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'04 DIMENSION with 4D	BT'04 DIMENSION without 4D	BT'04 PRO
SECTOR PROBE						
3S	H4701SZ	2323337	3S COMFORT SCAN SECTOR PROBE 1.5 - 3.6 MHz	V4.x	V4.x	V4.x
M3S	H45011SZ	2295649	M3S AMA SECTOR PROBE 1.5 - 4 MHz	V4.x	V4.x	N/A
5S	H440422LA	2347469	5S COMFORT-SCAN SECTOR PROBE 2.2 - 5.0 MHz	V4.x	V4.x	V4.x
7S	H40422LB	2263669	7S COMFORT-SCAN SECTOR PROBE 3.0 - 8.0 MHz	V4.x	V4.x	V4.x
10S	H4901PC	2298589	10 S SECTOR PROBE 4.0 - 12.0 MHz	V4.x	V4.x	V4.x
TEE						
6T	H45521DX	KN100092	PROBE TEE 6T 2.9 - 6.7 MHz	V4.x	V4.x	V4.x
6T	H45001YD	KN100022	PROBE TEE 6T 2.9 - 6.7 MHz	V4.x	V4.x	V4.x
6T	H45531HW	KN100069	PROBE TEE 6T FOR JAPAN 2.9 - 6.7 MHz	V4.x	V4.x	V4.x
9T	H45521DY	KN100072	PROBE, PEDIATRIC MPTEE 9T 3-3 - 10.0 MHz	V4.x	V4.x	V4.x
6Tv + ADAPTER	H45011AA H45001YF	KN100062 KZ200476	PROBE, TEE 2.9 - 6.7 MHz Adapter for use on Vivid 7	V4.x	V4.x	V4.x
LINEAR & CONVEX & OTHER						
7L	H40412LF	2294521	7L LINEAR PROBE TYPE (EXP) 3.2 - 7.5 MHz	V4.x	V4.x	V4.x
10L	H40212LG	2294523	10L LINEAR PROBE TYPE (EXP) 4.0 - 11.0 MHz	V4.x	V4.x	V4.x
12L	H40412LH	2295377	12L LINEAR PROBE TYPE (EXP) 5.0 - 11.5 MHz	V4.x	V4.x	V4.x
M7C	H40412LC	2294514	M7C MIH PROBE 3.0 - 8.0 MHz	V4.x	V4.x	V4.x
M12L	H40412LD	2294511	M12L MIH PROBE 6.0 - 13 MHz	V4.x	V4.x	V4.x

Table 9-63 Supported Probes and Software Versions - BT'04 (cont'd) sheet 2 of 2

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION		
				BT'04 DIMENSION with 4D	BT'04 DIMENSION without 4D	BT'04 PRO
3.5C	H4901PE	2050357	3.5C CONVEX PROBE 2.4 - 5.0 MHz	V4.x	V4.x	V4.x
5C	H40412LA	2294516	5C CONVEX PROBE TYPE (EXP) 3.6 - 8.0 MHz	V4.x	V4.x	V4.x
E8C	H40412LE	2294641	E8C PROBE 4.0 - 10 MHz	V4.x	V4.x	V4.x
8C	H40412LJ	2348094	8C PROBE 4.0 - 10 MHz	V4.x	V4.x	-
INTRAOPERATIVE						
i8L	H45511NW	KQ100006	I8L INTRAOPERATIVE PROBE 5.0 - 8.0 MHz	V4.x	V4.x	V4.x
i13L	H45511NT	KW100011	I13L INTRAOP.PROBE 8.0 - 13.0 MHz	V4.x	V4.x	V4.x
DOPPLER						
2D (P2D)	H4830JE	TE100024	"PEDOF" DOPPLER PROBE - 2 MHz	V4.x	V4.x	V4.x
6D (P6D)	H4830JG	TQ100002	"PEDOF" DOPPLER PROBE - 6 MHz	V4.x	V4.x	V4.x
REAL TIME 3D (4D)						
3V Probe	H4900PC	5124295	4D Probe 1.5 - 4.0 MHz	V4.x	N/A	N/A

9-26-6 Supported Probes and Software Versions - BT'01, BT'02 and BT'03

Table 9-64 Supported Probes and SW Versions - BT'01, BT'02 and BT'03 sheet 1 of 2

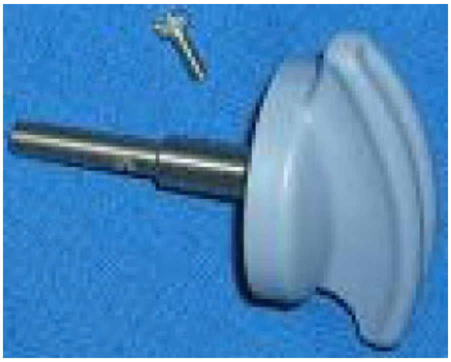
PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION				
				BT'01	BT'02	BT'02 PRO	BT'03 EXP	BT'03 PRO
SECTOR PROBE								
3S	H4701SZ	2323337	3S COMFORT SCAN SECTOR PROBE 1.5 - 3.6 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
M3S	H45011SZ	2295649	M3S AMA SECTOR PROBE 1.5 - 4 MHz	v1.x	v2.x	N/A	v3.x	N/A
5S	H4901RA	2290751	5S SECTOR PROBE 2.2 - 5.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
7S	H4000P	2263669	7S SECTOR PROBE 3.0 - 8.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
10S	H4901PCS	2298589	10 S SECTOR PROBE 4.0 - 12.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
TEE								
6T	H45001YD	KN100068	6T TEE PROBE 2.9 - 6.7 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
6T	H45001YD	KN100022	6T TEE PROBE 2.9 - 6.7 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
8T	H45001YE	KN100023	8T PED.TEE PROBE 3.3 - 8.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
9T	H45521DY	KN100072	PROBE, PEDIATRIC MPTEE 9T 3.3 - 10.0 MHz	-	-	-	v3.x	v3.x
P509		2256758	2.7 - 7.0 MHz	N/A	v2.x	v2.x	N/A	N/A
LINEAR & CONVEX & OTHERS								
7L	H40412LF	2294521	7L LINEAR PROBE TYPE (EXP) 3.2 - 7.5 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
10L	H40212LG	2294523	10L LINEAR PROBE TYPE (EXP) 4.0 - 11.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
12L	H40412LH	2295377	12L LINEAR PROBE TYPE (EXP) 5.0 - 11.5 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
M7C	H40412LC	2294514	M7C MIH PROBE 3.0 - 8.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
M12L	H40412LD	2294511	M12L MIH PROBE 6.0 - 13 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
3.5C	H4901PE	2296158	3.5C CONVEX PROBE 2.4 - 5.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x

Table 9-64 Supported Probes and SW Versions - BT’01, BT’02 and BT’03 (cont’d) sheet 2 of 2

PROBES	CAT NO.	PART NUMBER	NAME	SUPPORTED MODELS & SW VERSION				
				BT’01	BT’02	BT’02 PRO	BT’03 EXP	BT’03 PRO
5C	H40412LA	2294516	5C CONVEX PROBE TYPE (EXP) 3.6 - 8.0 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
E8C	H40412LD	2294641	E8C PROBE 4.0 - 10 MHz	-	v2.x	v2.x	v3.x	v3.x
8C	H40412LJ	2348094	8C PROBE TYPE 4.0 - 10 MHz	-	-	-	v3.x	-
INTRAOPERATIVE								
i8L	H45511NW	KQ100006	PROBE I8L INTRAOPERATIVE 5.0 - 8.0 MHz	-	-	-	v3.x	v3.x
i13L	H45511NT	KW100011	I13L INTRAOP.PROBE 8.0 - 13.0 MHz	-	v2.x	v2.x	v3.x	v3.x
DOPPLER								
2D (P2D)	H4830JE	TE100024	“PEDOF” DOPPLER PROBE - 2 MHz	v1.x	v2.x	v2.x	v3.x	v3.x
6D (P6D)	H4830JG	TQ100002	“PEDOF” DOPPLER PROBE - 6 MHz	v1.x	v2.x	v2.x	v3.x	v3.x

Section 9-27
Probe Service Parts

Table 9-65 Probe Service Part

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	KNOB REPAIR KIT	2363861	KIT INCLUDES: - KNOB - INSTRUCTION SHEET (not illustrated) - M2X8mm SCREW - ALLEN WRENCH, 2.5mm (not illustrated) - ALLEN WRENCH, 1.5mm (not illustrated) 	1	Y
2	BITEGUARD	086A0010		1	Y
3	TEE SCANHEAD PROTECTION COVER	KZ307808		1	Y
4	CLIP-ON BITE BLOCK	KZ200693		1	Y
5	CLIP-ON BITE BLOCK	KZ200687		1	Y
6	CLIPS FOR MEZANINE BOARD	KZ307771		1	Y
7	VIVID 7 TEST ATTENUATOR	AA200215	USED DURING VIVID 7 AUTOMATIC TEST	1	Y

Section 9-28
Other Probe Part(s)

Table 9-66 Other Probe Part(s)

ITEM	PART NAME	H-CAT #	PART NUMBER	DESCRIPTION	QTY	FRU
1	WALL RACK	H45001B	TY200774	FOR TEE PROBE STORAGE	1	N
2	BITE HOLE INDICATOR	H45531HS	KZ200800	FOR ALL GE'S TEE PROBES	1	Y

Section 9-29
Options

9-29-1 Overview

Table 9-67 Contents in this section

Section	Description	Page Number
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9-29-3	Options - Vivid 7 Dimension/Vivid 7 PRO - BT'06, Software v6.x	9-93
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9-29-6	Options - Vivid 7/Vivid 7 PRO - BT'03, SW v3.x	9-96
9-29-7	Options - Vivid 7/Vivid 7 PRO - BT'02, SW v2.x	9-98

9-29-2 Options - Vivid 7 Dimension/Vivid 7 PRO - BT'08, Software v7.x

Table 9-68 Options - Vivid 7 Dimension/PRO - BT'08, Software v7.x

ITEM	PART NAME	CAT #	COMMENTS
ADVANCED ACQUISITION			
1.	BI-PLANE IMAGING	H45541EM	
2.	ADVANCED QSCAN MAGING	H45521BB	STRAIN + TISSUE SYNC IMG
3.	ADVANCED QSCAN MAGING Rev. J	H45521BF	STRAIN + TISSUESYNCIMG (FOR JAPAN)
4.	AUTOMATED FUNCTIONAL IMAGING	H45541LA	
5.	TISSUE VELOCITY IMAGING & TISSUE TRACKING	H45521BD	
6.	BLOOD FLOW IMAGING	H45531NL	
7.	ANATOMICAL M-MODE	H45531NM	
8.	RODENT APPLICATION	H45521PB	
9.	LVO CONTRAST	H45531TA	
10.	ADVANCED CONTRAST (RESEARCH)	H45531TB	
11.	VASCULAR / ABDOMINAL CONTRAST	H45541EL	
PATIENT DATA & IMAGE MANAGEMENT			
12.	eVUE	H45531NQ	
13.	IMT - INTIMA MEDIA THICKNESS	H45541CW	
14.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS
15.	Q ANALYSIS	H45521BC	Q ANALYSIS
16.	AUTOMATED FUNCTION IMAGING	H45541LA	
17.	4D LV Volume	H45551KR	FOR INSTALLATION AND USE, SEE DIRECTION NUMBER: A190268 (English), A190269 (German), A190270 (Italian), A190271 (Spanish), A190272 (French), A190303 (Swedish), A190304 (Danish), A190305 (Dutch), A190306 (Korean)
18.	4D LV Volume rev.J.	H45551KS	
NETWORK OPTIONS			
19.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)
20.	DICOM MODALITY WL	H45521PD	DICOM MODALITY WORKLIST
21.	DICOM PRINT	H45521PE	DICOM PRINT
SCANNER UPGRADE			
22.	MPEGVUE	H45531NP	ADVANCED MPEG EXPORT

Table 9-69 Accessory for 4D LV Volume option

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	STEREO GLASSES FOR 3D VISUALIZATION	FD200123	USED TOGETHER WITH THE 4D LV OPTION	1	Y

9-29-3 Options - Vivid 7 Dimension/Vivid 7 PRO - BT'06, Software v6.x

Table 9-70 Options - Vivid 7 Dimension/PRO - BT'06, Software v6.x

ITEM	PART NAME	CAT #	COMMENTS
ADVANCED ACQUISITION			
1.	BI-PLANE IMAGING	H45541EM	
2.	ADVANCED QSCAN MAGING	H45521BB	STRAIN + TISSUE SYNC IMG
3.	ADVANCED QSCAN MAGING Rev. J	H45521BF	STRAIN + TISSUESYNCIMG (FOR JAPAN)
4.	AUTOMATED FUNCTIONAL IMAGING	H45541LA	
5.	TISSUE VELOCITY IMAGING & TISSUE TRACKING	H45521BD	
6.	BLOOD FLOW IMAGING	H45531NL	
7.	ANATOMICAL M-MODE	H45531NM	
8.	RODENT APPLICATION	H45521PB	
9.	LVO CONTRAST	H45531NR	
10.	ADVANCED CONTRAST (RESEARCH)	H45531NS	
11.	VASCULAR / ABDOMINAL CONTRAST	H45541EL	
PATIENT DATA & IMAGE MANAGEMENT			
12.	eVUE	H45531NQ	
13.	IMT - INTIMA MEDIA THICKNESS	H45541CW	
14.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS
15.	Q ANALYSIS	H45521BC	Q ANALYSIS
NETWORK OPTIONS			
16.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)
17.	DICOM MODALITY WL	H45521PD	DICOM MODALITY WORKLIST
18.	DICOM PRINT	H45521PE	DICOM PRINT
SCANNER UPGRADE			
19.	MPEGVUE	H45531NP	ADVANCED MPEG EXPORT

9-29-4 Options - Vivid 7 Dimension/Vivid 7 PRO - BT'05, Software v5.x

Table 9-71 Options - Vivid 7 Dimension/Vivid 7 PRO - BT'05, Software version v5.x

ITEM	PART NAME	CAT #	COMMENTS
ADVANCED ACQUISITION			
20.	ADVANCED QSCAN MAGING	H45521BB	STRAIN + TISSUE SYNC IMG
21.	ADVANCED QSCAN MAGING Rev. J	H45521BF	STRAIN + TISSUESYNCIMG (FOR JAPAN)
22.	BLOOD FLOW IMAGING	H45531NL	
23.	ANATOMICAL M-MODE	H45531NM	
24.	RODENT APPLICATION	H45521PB	
25.	LVO CONTRAST	H45531NR	
26.	ADVANCED CONTRAST (RESEARCH)	H45531NS	
27.	VASCULAR / ABDOMINAL CONTRAST	H45541EL	
PATIENT DATA & IMAGE MANAGEMENT			
28.	eVUE	H45531NQ	
29.	IMT - INTIMA MEDIA THICKNESS	H45541CW	
30.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS
31.	Q ANALYSIS	H45521BC	Q ANALYSIS
NETWORK OPTIONS			
32.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)
33.	DICOM MODALITY WL	H45521PD	DICOM MODALITY WORKLIST
34.	DICOM PRINT	H45521PE	DICOM PRINT
SCANNER UPGRADE			
35.	MPEGVUE	H45531NP	ADVANCED MPEG EXPORT

9-29-5 Options - Vivid 7 Dimension/Vivid 7/Vivid 7 PRO - BT'04, Software v4.x

Table 9-72 Options - Vivid 7 Dimension/Vivid 7/Vivid 7 PRO - BT'04, Software version v4.x

ITEM	PART NAME	CAT #	DESCRIPTION
ADVANCED ACQUISITION			
1.	TVI + TISSUETRACKING	H45521BD	
2.	BMI	H45531NL	
3.	ANATOMICAL M-MODE	H45531NM	
4.	AD Q-SCAN	H45521BB	ADVANCED Q-SCAN
5.	ADV Q-SCAN Rev. J	H45521BF	ADVANCED Q-SCAN (FOR JAPAN)
6.	TRUE SPEED	H45531NN	
7.	RODENT	H45521PB	RODENT APPLICATION
8.	LVO CONTRAST	H45531NR	
9.	ADV CONTRAST	H45531NS	ADVANCED CONTRAST (RESEARCH)
PATIENT DATA & IMAGE MANAGEMENT			
10.	eVUE	H45531NQ	
11.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS
12.	Q ANALYSIS	H45521BC	Q ANALYSIS
NETWORK OPTIONS			
13.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)
14.	DICOM MODALITY WL	H45521PD	DICOM MODALITY WORKLIST
15.	DICOM PRINT	H45521PE	DICOM PRINT
SCANNER UPGRADE			
16.	MPEGVUE	H45531NP	ADVANCED MPEG EXPORT

9-29-6 Options - Vivid 7/Vivid 7 PRO - BT'03, SW v3.x

Table 9-73 Options - Vivid 7, BT'03 Software v3.x

ITEM	PART NAME	CAT #	DESCRIPTION	QTY
ADVANCED ACQUISITION				
1.	CONTRAST IMAGING	H45521BA		
2.	STRAIN IMAGING	H45521BB	STRAIN + TISSUESYNCIMG	-
3.	STRAIN IMAGING Rev. J	H45521BF	STRAIN + TISSUESYNCIMG (FOR JAPAN)	-
4.	RODENT APPLICATION	H45521PB		-
5.	RF OPTION	H45521PC	RF OUTPUT	-
PATIENT DATA & IMAGE MANAGEMENT				
6.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS	-
7.	Q ANALYSIS	H45521BC	Q ANALYSIS	-
NETWORK OPTIONS				
8.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)	-
9.	DICOMMODALITY WL	H45521PD	DICOM MODALITY WORKLIST	-
10.	DICOMPRINT	H45521PE	DICOM PRINT	-
SCANNER UPGRADE				
11.	MPEGVUE	H45521PL	ADVANCED MPEG EXPORT	-

9-29-6 Options - Vivid 7/Vivid 7 PRO - BT'03, SW v3.x (cont'd)

Table 9-74 Options - Vivid 7 PRO, BT'03

ITEM	PART NAME	CAT #	DESCRIPTION	QTY
ADVANCED ACQUISITION				
1.	CONTRAST IMAGING	H45521BA		
2.	TVI + TISSUE TRACKING	H45521BD		-
3.	RODENT APPLICATION	H45521PB		
PATIENT DATA & IMAGE MANAGEMENT				
4.	ECHOSTRESS	H45001YT	ECHO STRESS INCL. DIGITAL CONT. CAPTURE & QTVI STRESS	-
5.	Q ANALYSIS	H45521BC	Q ANALYSIS	-
NETWORK OPTIONS				
6.	ECHODICOM	H45001YW	ECHO DICOM (DICOM VIA NETWORK)	-
7.	DICOMMODALITY WL	H45521PD	DICOM MODALITY WORKLIST	-
8.	DICOMPRINT	H45521PE	DICOM PRINT	-
SCANNER UPGRADE				
9.	MPEGVUE	H45521PL	ADVANCED MPEG EXPORT	-

9-29-7 Options - Vivid 7/Vivid 7 PRO - BT'02, SW v2.x

Table 9-75 Options - Vivid 7, BT'02

ITEM	PART NAME	CAT #	DESCRIPTION	QTY
INCLUDING ACQUISITION				
1.	ECHOSTRESS	H45001NE		-
2.	CONTRAST IMAGING	H45521BA	ACQUISITION MODES ONLY	-
3.	STRAIN IMAGING	H45521BB	UNITS WITHOUT 4 MLA	
4.	STRAIN IMAGING 2	H45521BF	UNITS WITH 4 MLA	
5.	QANALYSIS	H45521BC		-
NETWORK OPTIONS				
6.	ECHODICOM	H45001YW	(DICOM VIA NETWORK)	-

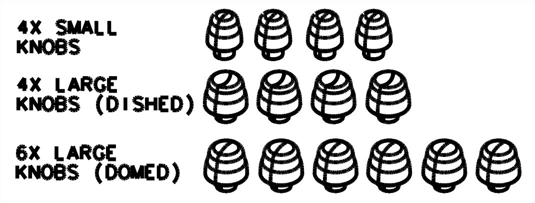
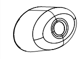
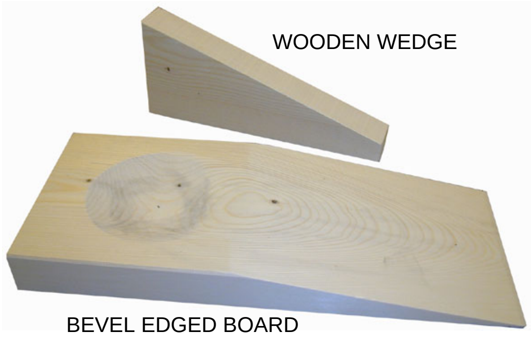
Table 9-76 Options - Vivid 7 PRO, BT'02

ITEM	PART NAME	CAT #	DESCRIPTION	QTY
PATIENT DATA MANAGEMENT INCLUDING ACQUISITION				
1.	ECHOSTRESS	H45001YT		-
2.	TISSUE TRACKING	H45521BD		
3.	CONTRAST IMAGING	H4552BA	ACQUISITION MODES ONLY	
4.	Q ANALYSIS	H4552BC		
NETWORK OPTION				
5.	ECHODICOM	H45001YW	(DICOM VIA NETWORK)	-

Section 9-30
Kits

9-30-1 Service Kits

Table 9-77 Service Kits, Overview

Item	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BUMPER KIT FROGLEG	FC200086	BUMPER KIT, FROGLEG	1	Y
2	COLUMN COVER SET	FC200088		1	Y
3	KNOB KIT	2188902-8	ROUND KNOBS ON OPERATOR PANEL	1	Y
4	UNIVERSAL KNOB KIT FOR LOGIQ9/ VIVID7	2384216	**THIS KIT HAS BEEN REPLACED BY THE KIT 5114700 & 5115063 (SEE BELOW)** THIS KIT CONTAINS; - 5 SLIDE POT KNOBS, - 2 SMALL KNOBS, - 3 LARGE, DOMED KNOBS, - 4 GAIN CONTROL KNOBS (L9 ONLY) AND - 2 LARGE DISHED KNOBS (V7 ONLY)	1	Y
5	UNIVERSAL KNOB KIT FOR L9-V7 Improved	5114700	 4X SMALL KNOBS 4X LARGE KNOBS (DISHED) 6X LARGE KNOBS (DOMED)	1	Y
6	KNOBS, SLIDE POT KNOB, KIT OF 10 FOR LOGIQ 9/ VIVID 7	5115063	THIS KIT CONTAINS TEN (10X) KNOBS 	1	Y
8	VIVID 7 RING OF KEYS FRU KIT	FC200484	This part is located inside the Operator Panel and is a vital part of the buttons around the trackball	1	Y
10	WHEEL CHANGE KIT	FC200829		1	Y
11	SHIM KIT FOR LOGIQ9 OP PANEL	5116529	CONTENT IN SHIM KIT (Can be used for VIVID 7 too) • 2 x Shim Washer 0.635 mm thick • 1 x Shim Washer 1mm thick	1	Y

9-30-2 Vivid 7 Upgrade Kits

9-30-2-1 BT'08 Upgrade Kits

Table 9-78 Vivid 7 BT'08 Upgrade Kits

ITEM	KIT NAME	PART NUMBER	COMMENTS	INSTALLATION INSTRUCTIONS
1.	V7 BT'06 to BT'08 upgrade	FD200027		DESCRIBED IN VIVID 7 BT'08 UPGRADE MANUAL, FD094119
2.	V7 BT'05 to BT'08 upgrade	FD200026		
3.	V7 BT'04 to BT'08 Upgrade	FD200025		
4.	V7 BT'03-RFI to V7 BT'08	FD200024		
5.	V7 BT'08 Multi Dimensional and Volume Imaging	FD200011	FOR UPGRADED BT'05 SYSTEMS	
6.		FD200014	FOR UPGRADED BT'04 SYSTEMS	
1.		FD200017	FOR NEW BT'08 SYSTEMS AND FOR UPGRADED BT'06 SYSTEMS	
2.		FD200021	FOR UPGRADED BT'03 (RFI) SYSTEMS	
3.	V7 BT'08 Volume Imaging	FD200012	FOR UPGRADED BT'05 SYSTEMS	
4.		FD200015	FOR UPGRADED BT'04 SYSTEMS	
5.		FD200018	FOR NEW BT'08 SYSTEMS AND FOR UPGRADED BT'06 SYSTEMS	
6.		FD200022	FOR UPGRADED BT'03 (RFI) SYSTEMS	
7.	V7 BT'08 Multi Dimensional Imaging	FD200013	FOR UPGRADED BT'05 SYSTEMS	
8.		FD200016	FOR UPGRADED BT'04 SYSTEMS	
9.		FD200019	FOR NEW BT'08 SYSTEMS AND FOR UPGRADED BT'06 SYSTEMS	
10.		FD200023	FOR UPGRADED BT'03 (RFI) SYSTEMS	
11.	V7 BT'08 Completion to Multi Dimensional Imaging and Volume Imaging	FD200029		

9-30-2-2 BT’06 Upgrade Kits

Table 9-79 Vivid 7 BT’06 Upgrade Kits

ITEM	KIT NAME	PART NUMBER	COMMENTS	INSTALLATION INSTRUCTIONS
1.	V7 BT’06 Dimension to BT’06 Multi Dimensional Imaging and Volume Imaging	FC200909	FOR BT’06 SYSTEMS AND UPGRADED BT’05 SYSTEMS	Described in Vivid 7 BT’06 Upgrade Manual, FC094897
2.	V7 BT’06 Dimension to BT’06 Multi Dimensional Imaging and Volume Imaging	FC200911	FOR UPGRADED BT’04 AND BT’03 SYSTEMS	
3.	V7 BT’06 Dimension to BT’06 Volume Imaging	FC200912	FOR BT’06 SYSTEMS AND UPGRADED BT’05 SYSTEMS	
4.	V7 BT’06 Dimension to BT’06 Volume Imaging	FC200913	FOR UPGRADED BT’04 AND BT’03 SYSTEMS	
5.	V7 BT’06 Dimension to BT’06 Multi Dimensional Imaging	FC200914	FOR BT’06 SYSTEMS AND UPGRADED BT’05 SYSTEMS	
6.	V7 BT’06 Dimension to BT’06 Multi Dimensional Imaging	FC200916	FOR UPGRADED BT’04 AND BT’03 SYSTEMS	
7.	V7 BT’06 Completion to Multi Dimensional Imaging and Volume Imaging	FC200917		
8.	V7 BT’05 to BT’06 upgrade	FC200908		
9.	V7 BT’04 to BT’06 Upgrade	FC200907		
10.	V7 BT’03-RFI to V7 BT’06	FC200886		

9-30-2-3 BT’05 Upgrade Kits

Table 9-80 Vivid 7 BT’05 Upgrade Kits

ITEM	KIT NAME	PART NUMBER	COMMENTS	INSTALLATION INSTRUCTIONS
1.	V7 BT’05 Dimension to BT’05 Multi Dimensional Imaging	FC200668		Described in Vivid 7 BT’05 Upgrade Manual, FC094747
2.	V7 BT’05 Dimension to BT’05 Volume Ultrasound	FC200669		
3.	V7 BT’05 Dimension to BT’05 Multi Dimensional Imaging and Volume Imaging	FC200694		
4.	V7 BT’04 upgrade to V7 BT’05 (Software upgrade only)	FC200686		
5.	V7 BT’04 Dimension upgrade to BT’05 Multi Dimensional Imaging and Volume Imaging	FC200744		
6.	V7 BT’04 Dimension upgrade to BT’05 Volume Ultrasound	FC200745		
7.	V7 BT’04 Dimension upgrade to BT’05 Multi Dimensional Imaging	FC200746		
8.	V7 BT’03 to V7 BT’05	FC200687		Described in Vivid 7 BT’03 to BT’05 Upgrade Manual, FC094827

9-30-2-4 BT’03 - RFT Upgrade Kits

Table 9-81 Vivid 7 Upgrade Kits

ITEM	KIT NAME	PART NUMBER	COMMENTS	INSTALLATION INSTRUCTIONS
1.	VANTAGE UPGRADE TO BT’03 (SOFTWARE v3.x)	FC200406	SOFTWARE, HARDWARE AND MECHANICAL UPGRADE	Described in Vivid 7 BT’03 Upgrade Manual, FC294347.

9-30-3 Language Kits

Table 9-82 Language Kits, Overview

Item	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	LANGUAGE ASSEMBLY - GERMAN	NEW KITS FOR EACH BT.	- Alphanumeric Keyboard per language - KEYTOPS VIVID 7 - VIVID 7 USER MANUAL - OPERATOR PANEL LANGUAGE BUTTONS (DOCUMENT)	1	N
2	LANGUAGE ASSEMBLY - FRENCH				
3	LANGUAGE ASSEMBLY - ITALIAN				
4	LANGUAGE ASSEMBLY - SPANISH				
5	LANGUAGE ASSEMBLY - PORTUGESE				
6	LANGUAGE ASSEMBLY - SWEDISH				
7	LANGUAGE ASSEMBLY - NORWEGIAN				

9-30-4 Parts List for Bumper Kit, Frogleg

NOTE: Not used on Vivid 7 PRO.

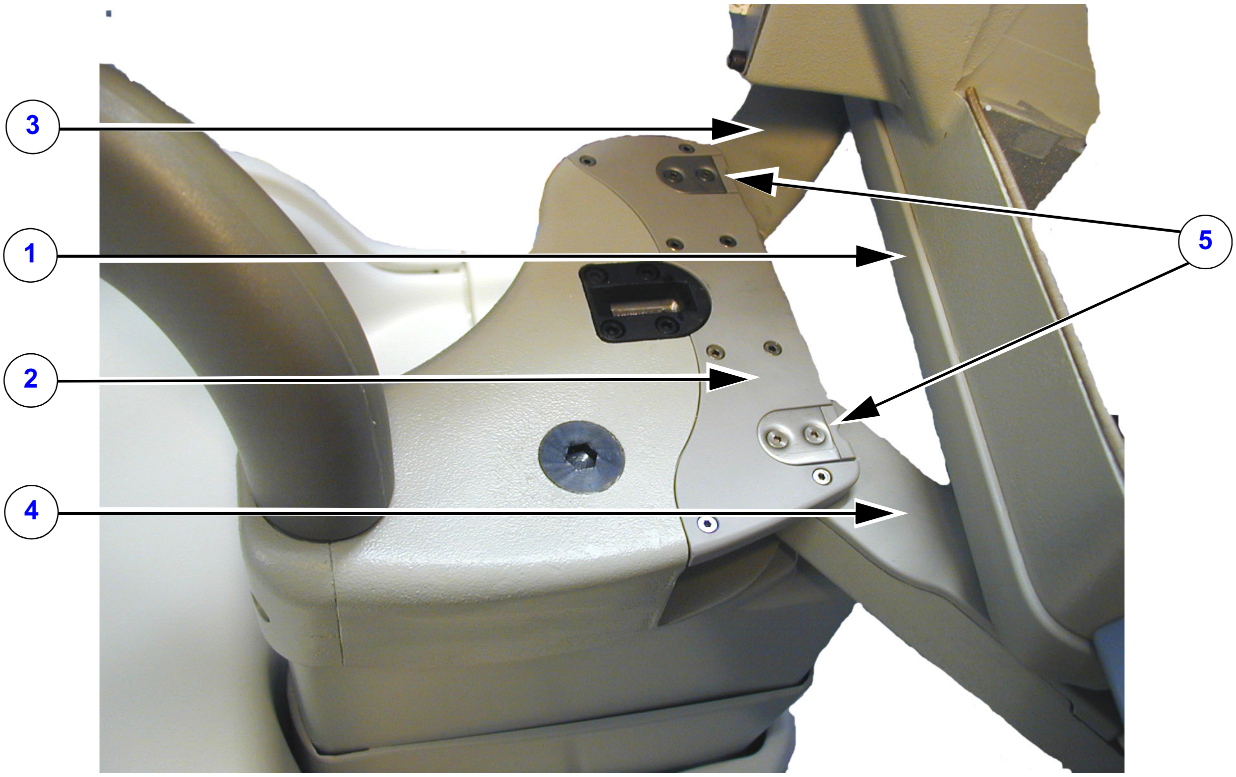


Figure 9-35 Bumper Kit, Frogleg, Base Seen From Above

Table 9-83 Bumper Kit, Frogleg - Part Number FC200086

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BUMPER CRASH PAD	-	Bumper Crash Rear	1	N
2	BUMPER INNER BOSS	-	-	1	N
3	BUMPER RIGHT FROGLEG	-	-	1	N
4	BUMPER LEFT FROGLEG	-	-	1	N
5	BUMPER INNER BOSS CRASH	-	-	1	N
	BUMPER CONSOLE REAR	-		1	N

9-30-5 Parts Lists for Column Cover Kit

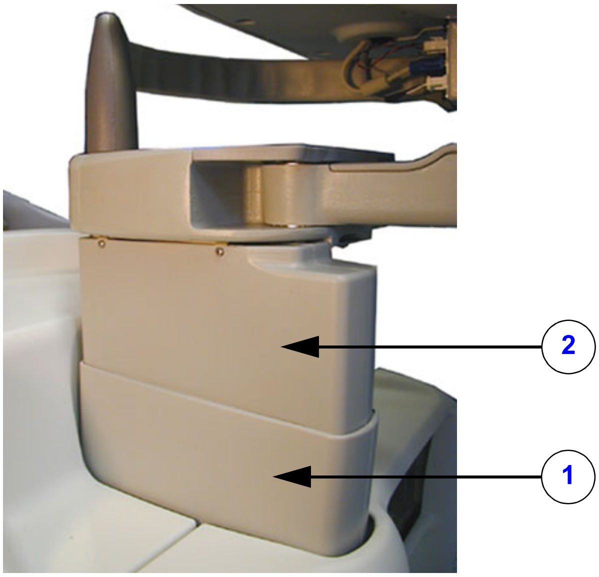


Figure 9-36 Upper and Lower Column Cover

Table 9-84 Column Cover Kit - Part Number FC200088

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	Cover, Column, Lower	-	-	1	-
2	Cover, Column, Upper	-	-	1	-

Section 9-31
Accessory Boxes, Vivid 7 / Vivid 7 PRO

9-31-1 Accessory Box - Delivered with System

NOTE: *Starting with the introduction of software version v4.x, the User Manuals and the Service Manual is delivered as electronic files on a CD. Paper copies may be ordered from GE. Some countries require paper copies.*

NOTE: *The Unpacking/Packing procedure is delivered on paper.*

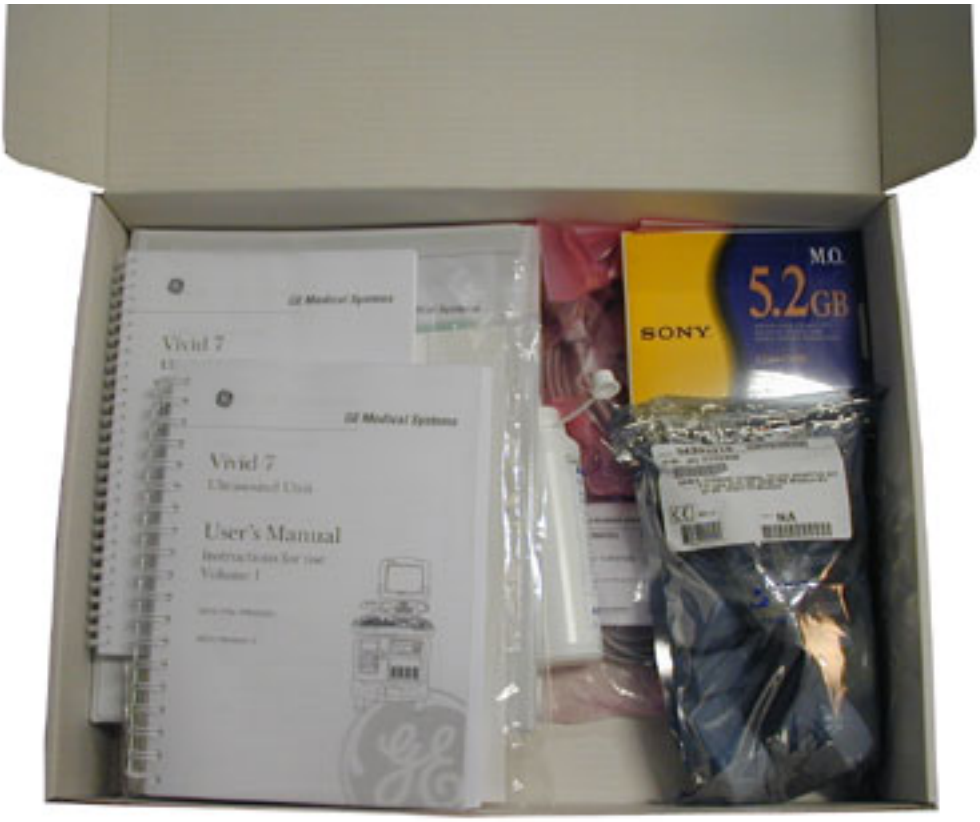


Figure 9-37 Accessory Box, Vivid 7/Vivid 7 PRO

Table 9-85 Accessory Box, Vivid 7/Vivid 7 PRO

ITEM	NAME	DESCRIPTION	QTY
1	ACCESSORY BOX, VIVID 7, US		1
2	ACCESSORY BOX, VIVID 7, EUR.		1

Section 9-31 Accessory Boxes, Vivid 7 / Vivid 7 PRO (cont'd)

Table 9-86 Typical Contents in Vivid 7 Accessory Box

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	CD V7 MANUALS MULTILING.	Includes the User's and Service Manuals.		1	N
	- Vivid 7 User Manual	*See "Product Manuals" on page 9-108.*		1	N
	- Reference Manual	*See "Product Manuals" on page 9-108.*		1	N
	- Probe User Manual(s)	As Required			N
	- Vivid 7 Service Manual, English	This manual *See "Product Manuals" on page 9-108.*		1	N
2	Gel Ultrasound Bluescan	098B2001	Bottle	1	N
3	MO Disk	066E0519	Optional	1	N
4	Cable ECG Marquette IEC	164L0026	All countries except USA	1	N
5	Leadwires ECG Marquette IEC	164L0028	All countries except USA	1	N
6	EUROPE POWER CABLE	H4000ZB / 070C3194	Most European Countries	1	N
	US POWER CABLE	H4000ZA / 5148381 OR 070C3193	USA		
	UK POWER CABLE	H4000ZD	UNITED KINGDOM		
	CHINA POWER CABLE	H4000ZC	CHINA		
	JAPAN POWER CABLE	H4000ZK	JAPAN		
9	Cable ECG Marquette AHA	164L0025	USA only	1	N
10	Leadwires ECG Marquette AHA	164L0027	USA only	1	N

9-31-2 Accessory Box - SERVICE V7, US

Table 9-87 Typical Contents, Accessory Box - SERVICE V7, US, Part Number FC200111

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	V7 ONLINE MANUALS 4.0	FC200670		1	N
2	VIVID 7 & ECHOPAC PC APPL SW 4.x	FC200569		1	N
3	V7 SYSTEM SW CD 2.X FOR BEP 3	FC200565		1	N
4	GEL ULTRASOUND BLUESCAN	098B2001		1	N
5	DISK FOR MO-DRIVE 8.6 GB	066E0514	NOTE: Vivid 7 with software version 2.2.5 and below supports MO disks up to 8.6 GBytes. Support for 9.1 GBytes disks was introduced for software version 2.3.0.	1	N
6	CABLE ECG MARQUETTE AHA	164L0025		1	N
7	LEADWIRES ECG MARQUETTE AHA	164L0027		1	N
8	CABLE MAINS 3,5M 3*1.90MM2	5148381 OR 070C3193		1	N

Section 9-32
Product Manuals

9-32-1 Overview

NOTE: *Starting from the introduction of software version v4.x, the User Manuals and the Service Manual are delivered as electronic files on a CD-ROM. Paper copies may be ordered from GE.*

NOTE: *The Vivid 7 Unpacking Procedure is delivered on paper.*

Table 9-88 Contents in this section

Section	Description	Page Number
9-32-1	Overview	9-108
9-32-2	Product Manuals for Units with Software v7.x	9-109
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9-32-8	Product Manuals for Units with Software v4.x	9-116
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9-32-2 Product Manuals for Units with Software v7.x

These manuals (PDF files) are located on the BT07 CD Vivid 7 Manuals, multilanguages, Part Number: FD200080.

Table 9-89 Product Manuals for Units with Software Version v7.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID 7 SERVICE MANUAL, ENGLISH	FC091194	THIS MANUAL	1	N
2	VIVID7 USER MANUAL, ENGLISH	FD092052		1	N
	VIVID7 USER MANUAL, GERMAN	FD092053			
	VIVID7 USER MANUAL, FRENCH	FD092054			
	VIVID7 USER MANUAL, ITALIAN	FD092055			
	VIVID7 USER MANUAL, SPANISH	FD092056			
	VIVID7 USER MANUAL, PORTUGESE	FD092057			
	VIVID7 USER MANUAL, JAPANESE	FD092058			
	VIVID7 USER MANUAL, CHINESE	FD092059			
	VIVID7 USER GUIDE, SWEDISH	FD092060			
	VIVID7 USER GUIDE, NORWEGIAN	FD092061			
	VIVID7 USER GUIDE, DANISH	FD092062			
	VIVID7 USER GUIDE, POLISH	FD092063			
	VIVID7 USER GUIDE, FINNISH	FD092064			
	VIVID7 USER GUIDE, GREEK	FD092065			
	VIVID7 USER GUIDE, RUSSIAN	FD092066			
	VIVID7 USER GUIDE, DUTCH	FD092067			
	VIVID7 USER MANUAL, HUNGARIAN	FD092068			
	VIVID7 USER MANUAL, SLOVAK	FD092069			
	VIVID7 USER MANUAL, ROMANIAN	FD092070			
	VIVID7 USER MANUAL, CZECH	FD092071			
	VIVID7 USER MANUAL, LATVIAN	FD092072			
	VIVID7 USER MANUAL, LIHUANIAN	FD092073			
	VIVID7 USER MANUAL, TURKISH	FD092074			
	VIVID7 USER MANUAL, ESTONIAN	FD092075			
	VIVID7 USER MANUAL, KOREAN	FD092076			
3	VIVID7/ECHOPAC PC REFERENCE MANUAL	FD092077	REFERENCE MANUAL, ENGLISH	1	N

9-32-3 4D Manuals for Units with Software v7.x

These manuals (PDF files) are located on the BT07 CD Vivid 7 Manuals, multilanguages, Part Number: FD200080.

Table 9-90 4D User Manual for Software Version v7.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL ENGLISH	FD092081		1	N
2	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL GERMAN	FD092082			
3	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL FRENCH	FD092083			
4	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL ITALIAN	FD092084			
5	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL SPANISH	FD092085			
6	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL PORTUGUESE	FD092086			
7	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL JAPANESE	FD092087			
8	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL CHINESE	FD092088			
9	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL SWEDISH	FD092089			
10	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL NORWEGIAN	FD092090			
11	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL DANISH	FD092091			
12	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL POLISH	FD092092			
13	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL FINNISH	FD092093			
14	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL GREEK	FD092094			
15	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL RUSSIAN	FD092095			
16	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL DUTCH	FD092096			
17	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL HUNGARIAN	FD092097			
18	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL SLOVAK	FD092098			
19	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL ROMANIAN	FD092099			
20	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL CZECH	FD092100			
21	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL LATVIAN	FD092101			

Table 9-90 4D User Manual for Software Version v7.x (cont'd)

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
22	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL LITHUANIAN	FD092102		1	N
23	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL TURKISH	FD092103			
24	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL ESTONIAN	FD092104			
25	BT07 VIVID7/ECHOPAC PC 4D/MULTIPLANE IMAGING USER MANUAL KOREAN	FD09210			

9-32-4 Product Manuals for Units with Software v6.x

These manuals (PDF files) are located on the Vivid 7 Manual CDs, disc #1 and disc #2, Part Number: FC200860.

Table 9-91 Product Manuals for Units with Software Version v6.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID 7 SERVICE MANUAL, ENGLISH	FC091194	THIS MANUAL	1	N
2	VIVID7 USER MANUAL, ENGLISH	FC092841		1	N
	VIVID7 USER MANUAL, GERMAN	FC092842			
	VIVID7 USER MANUAL, FRENCH	FC092843			
	VIVID7 USER MANUAL, ITALIAN	FC092844			
	VIVID7 USER MANUAL, SPANISH	FC092845			
	VIVID7 USER MANUAL, PORTUGESE	FC092846			
	VIVID7 USER MANUAL, CHINESE	FC092848			
	VIVID7 USER GUIDE, SWEDISH	FC092849			
	VIVID7 USER GUIDE, NORWEGIAN	FC092852			
	VIVID7 USER GUIDE, DANISH	FC092853			
	VIVID7 USER MANUAL, JAPANESE	FC092847			
	VIVID7 USER MANUAL, CHINESE	FC092848			
	VIVID7 USER GUIDE, POLISH	FC092854			
	VIVID7 USER GUIDE, FINNISH	FC092855			
	VIVID7 USER GUIDE, GREEK	FC092856			
	VIVID7 USER GUIDE, RUSSIAN	FC092857			
	VIVID7 USER GUIDE, DUTCH	FC092858			
	VIVID7 USER MANUAL, HUNGARIAN	FC092981			
	VIVID7 USER MANUAL, SLOVAK	FC092982			
	VIVID7 USER MANUAL, ROMANIAN	FC092983			
	VIVID7 USER MANUAL, CZECH	FC092984			
	VIVID7 USER MANUAL, LATVIAN	FC092985			
	VIVID7 USER MANUAL, LIHUANIAN	FC092986			
	VIVID7 USER MANUAL, TURKISH	FC092987			
	VIVID7 USER MANUAL, ESTONIAN	FC092988			
	VIVID7 USER MANUAL, KOREAN	FC092989			
3	VIVID7 USER REFER. MANUAL	FC092859	REFERENCE MANUAL, ENGLISH	1	N

9-32-5 4D Manuals for Units with Software v6.x

These manuals (PDF files) are located on the Vivid 7 Online Manual Multi language CDs disc #1 and disc #2, Part Number: FC200860.

Table 9-92 4D User Manual for Software Version v6.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	V7/EPPC 4D/MULTIPL. IMAG., ENGLISH	FC092861	VIVID 7 AND ECHOPAC PC 4D/MULTIPLANE USER MANUAL	1	N
2	VIVID 7 4D USER MANUAL, GERMAN	FC092862			
3	VIVID 7 4D USER MANUAL, FRENCH	FC092863			
4	VIVID 7 4D USER MANUAL, ITALIAN	FC092864			
5	VIVID 7 4D USER MANUAL, SPANISH	FC092865			
6	VIVID 7 4D USER MANUAL, PORTUGESE	FC092866			
7	VIVID 7 4D USER MANUAL, SWEDISH	FC092870			
8	VIVID 7 4D USER MANUAL, NORWEGIAN	FC092871			
9	VIVID 7 4D USER MANUAL, DANISH	FC092872			
10	VIVID 7 4D USER MANUAL, JAPANESE	FC092868			
11	VIVID 7 4D USER MANUAL, CHINESE	FC092869			
12	VIVID 7 4D USER MANUAL, POLISH	FC092873			
13	VIVID 7 4D USER MANUAL, FINNISH	FC092874			
14	VIVID 7 4D USER MANUAL, GREEK	FC092875			
15	VIVID 7 4D USER MANUAL, RUSSIAN	FC092876			
16	VIVID 7 4D USER MANUAL, DUTCH	FC092877			
17	VIVID 7 4D USER MANUAL, HUNGARIAN	FC092990			
18	VIVID 7 4D USER MANUAL, SLOVAK	FC092991			
19	VIVID 7 4D USER MANUAL, ROMANIAN	FC092992			
19	VIVID 7 4D USER MANUAL, CZECH	FC092993			
20	VIVID 7 4D USER MANUAL, LATVIAN	FC092994			
21	VIVID 7 4D USER MANUAL, LITHUANIAN	FC092995			
22	VIVID 7 4D USER MANUAL, TURKISH	FC092996			
23	VIVID 7 4D USER MANUAL, ESTONIAN	FC092997			
24	VIVID 7 4D USER MANUAL, KOREAN	FC092998			

9-32-6 Product Manuals for Units with v5.x Software

These manuals (PDF files) are located on the Vivid 7 Online Manual Multi language CD, Part Number: FC200750.

Table 9-93 Product Manuals for Units with Software Version v5.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID 7 SERVICE MANUAL, ENGLISH	FC091194	THIS MANUAL	1	N
2	VIVID7 USER MANUAL, ENGLISH	FC092710		1	N
	VIVID7 USER MANUAL, GERMAN	FC092711			N
	VIVID7 USER MANUAL, FRENCH	FC092712			N
	VIVID7 USER MANUAL, ITALIAN	FC092713			N
	VIVID7 USER MANUAL, SPANISH	FC092714			N
	VIVID7 USER MANUAL, BRAZILE PORTUGESE	FC092715			N
	VIVID7 USER GUIDE, SWEDISH	FC092718			N
	VIVID7 USER GUIDE, NORWEGIAN	FC092719			N
	VIVID7 USER GUIDE, DANISH	FC092720			N
	VIVID7 USER MANUAL, JAPANESE	FC092716			N
	VIVID7 USER MANUAL, CHINESE	FC092717			N
	VIVID7 USER GUIDE, POLISH	FC092721			N
	VIVID7 USER GUIDE, FINNISH	FC092722			N
	VIVID7 USER GUIDE, GREEK	FC092723			N
	VIVID7 USER GUIDE, RUSSIAN	FC092724			N
	VIVID7 USER GUIDE, DUTCH	FC092725			N
3	VIVID7 USER REFER. MANUAL	FC092536	REFERENCE MANUAL, ENGLISH	1	N

9-32-7 4D Manuals for Units with Software v5.x

These manuals (PDF files) are located on the Vivid 7 Online Manual Multi language CD, Part Number: FC200750.

Table 9-94 4D User Manual for Software Version v5.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID7 4D USER MANUAL, ENGLISH	FC092727		1	N
	VIVID 7 4D USER MANUAL, GERMAN	FC092728			N
	VIVID 7 4D USER MANUAL, FRENCH	FC092729			N
	VIVID 7 4D USER MANUAL, ITALIAN	FC092730			N
	VIVID 7 4D USER MANUAL, SPANISH	FC092731			N
	VIVID 7 4D USER MANUAL, BRAZILE PORTUGESE	FC092732			N
	VIVID 7 4D USER MANUAL, SWEDISH	FC092735			N
	VIVID 7 4D USER MANUAL, NORWEGIAN	FC092736			N
	VIVID 7 4D USER MANUAL, DANISH	FC092737			N
	VIVID 7 4D USER MANUAL, JAPANESE	FC092733			N
	VIVID 7 4D USER MANUAL, CHINESE	FC092734			N
	VIVID 7 4D USER MANUAL, POLISH	FC092738			N
	VIVID 7 4D USER MANUAL, FINNISH	FC092739			N
	VIVID 7 4D USER MANUAL, GREEK	FC092740			N
	VIVID 7 4D USER MANUAL, RUSSIAN	FC092741			N
	VIVID 7 4D USER MANUAL, DUTCH	FC092742			N

9-32-8 Product Manuals for Units with Software v4.x

Table 9-95 Product Manuals for Units with Software Version v4.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID 7 SERVICE MANUAL, ENGLISH	FC091194	THIS MANUAL	1	N
2	VIVID7 USER MANUAL, ENGLISH	FC092520		1	N
	VIVID7 USER MANUAL, GERMAN	FC092521			N
	VIVID7 USER MANUAL, FRENCH	FC092522			N
	VIVID7 USER MANUAL, ITALIAN	FC092523			N
	VIVID7 USER MANUAL, SPANISH	FC092524			N
	VIVID7 USER MANUAL, PORTUGESE	FC092671			N
	VIVID7 USER GUIDE, SWEDISH	FC092528			N
	VIVID7 USER GUIDE, NORWEGIAN	FC092529			N
	VIVID7 USER GUIDE, DANISH	FC092530			N
	VIVID7 USER MANUAL, JAPANESE	FC092526			N
	VIVID7 USER MANUAL, CHINESE	FC092527			N
	VIVID7 USER GUIDE, POLISH	FC092531			N
	VIVID7 USER GUIDE, FINNISH	FC092532			N
	VIVID7 USER GUIDE, GREEK	FC092533			N
	VIVID7 USER GUIDE, RUSSIAN	FC092534			N
	VIVID7 USER GUIDE, DUTCH	FC092535			N
	VIVID 7 USER MANUAL, BRAZIL	FC092671			N
3	VIVID7 USER REFER. MANUAL	FC092536	REFERENCE MANUAL, ENGLISH	1	N
	VIVID 7 REFERENCE MANUAL, BRAZIL	FC092672	REFERENCE MANUAL		N

9-32-9 Product Manuals for 4D/Multiplan Imaging

Table 9-96 Product Manuals for 4D/Multiplan Imaging

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	V7/EPPC 4D/MULTIPL. IMAG., ENGLISH	FC092540		1	N
	V7/EPPC 4D/MULTIPL. IMAG., GERMAN	FC092541			N
	V7/EPPC 4D/MULTIPL. IMAG., FRENCH	FC092542			N
	V7/EPPC 4D/MULTIPL. IMAG., ITAL	FC092543			N
	V7/EPPC 4D/MULTIPL. IMAG., SPAN	FC092544			N
	V7/EPPC 4D/MULTIPL. IMAG., PORT	FC092545			N
	V7/EPPC 4D/MULTIPL. IMAG., SWEDISH	FC092548			N
	V7/EPPC 4D/MULTIPL. IMAG., NORWEGIAN	FC092549			N
	V7/EPPC 4D/MULTIPL. IMAG., DANISH	FC092550			N
	V7/EPPC 4D/MULTIPL. IMAG., JAPANESE	FC092546			N
	V7/EPPC 4D/MULTIPL. IMAG., CHINESE	FC092547			N
	V7/EPPC 4D/MULTIPL. IMAG., POL	FC092551			N
	V7/EPPC 4D/MULTIPL. IMAG., FINN	FC092552			N
	V7/EPPC 4D/MULTIPL. IMAG., GRE	FC092553			N
	V7/EPPC 4D/MULTIPL. IMAG., RUSS	FC092554			N
	V7/EPPC 4D/MULTIPL. IMAG., DUTCH	FC092555			N
	V7/EPPC 4D/MULTIPL. IMAG., BRAZIL	FC092673			N

9-32-10 Product Manuals for Units with Software Version v3.x

Table 9-97 Product Manuals for Units with Software Version v3.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	VIVID 7 SERVICE MANUAL, ENGLISH	FC091194	This manual	1	N
2	VIVID 7 USER MANUAL, ENGLISH	FC092326		1	N
	VIVID 7 USER MANUAL, GERMAN	FC092327			N
	VIVID 7 USER MANUAL, FRENCH	FC092328			N
	VIVID 7 USER MANUAL, ITALIAN	FC092329			N
	VIVID 7 USER MANUAL, SPANISH	FC092331			N
	VIVID 7 USER MANUAL, PORTUGESE	FC092332			N
	VIVID 7 USER GUIDE, SWEDISH	FC092333			N
	VIVID 7 USER GUIDE, NORWEGIAN	FC092334			N
	VIVID 7 USER GUIDE, DANISH	FC092335			N
	VIVID 7 USER MANUAL, JAPANESE	FC092336			N
	VIVID 7 USER MANUAL, CHINESE	FC092337			N
	VIVID 7 USER GUIDE, POLISH	FC092338			N
	VIVID 7 USER GUIDE, FINNISH	FC092339			N
	VIVID 7 USER GUIDE, GREEK	FC092341			N
	VIVID 7 USER GUIDE, RUSSIAN	FC092342			N
	VIVID 7 USER GUIDE, DUTCH	FC092343			N
3	VIVID 7 USER REFER. MANUAL	FC092355	Reference Manual	1	N

9-32-11 Product Manuals for Units with Software Version v2.x

Table 9-98 Product Manuals for Units with Software Version v2.x

ITEM	NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	Vivid 7 Service Manual, English	FC091194	This manual	1	N
2	User Manual, Vivid 7, English	FB092820	V7 USER MAN.	1	N
	User Manual, Vivid 7, German	FB092821	V7 USER MAN.		N
	User Manual, Vivid 7, French	FB092822	V7 USER MAN.		N
	User Manual, Vivid 7, Italian	FB092823	V7 USER MAN.		N
	User Manual, Vivid 7, Spanish	FB092824	V7 USER MAN.		N
	User Manual, Vivid 7, Portuguese	FB092825	V7 USER MAN.		N
	User Manual, Vivid 7, Swedish	FB092866	V7 USER MAN.		N
	User Manual, Vivid 7, Norwegian	FB092867	V7 USER MAN.		N
	User Manual, Vivid 7, Danish	FB092868	V7 USER MAN.		N
	User Manual, Vivid 7, Dutch	FB092869	V7 USER MAN.		N
	User Manual, Vivid 7, Greek	FB092870	V7 USER MAN.		N
	User Manual, Vivid 7, Russian	FB092871	V7 USER MAN.		N
	User Manual, Vivid 7, Turkish	FB092872	V7 USER MAN.		N
	User Manual, Vivid 7, Japanese	FB092873	V7 USER MAN.		N
	User Manual, Vivid 7, Chinese	FB092874	V7 USER MAN.		N
	User Manual, Vivid 7, Polish	FB092875	V7 USER MAN.		N
	User Manual, Vivid 7, Hungarian	FB092877	V7 USER MAN.		N
	User Manual, Vivid 7, Finnish	FB092958	V7 USER MAN		N
3	Reference Manual Volume 2	FB092888	V7 REFERENCE MAN	1	N

Section 9-33
Packing Parts for Reshipment - Vivid 7 with LCD

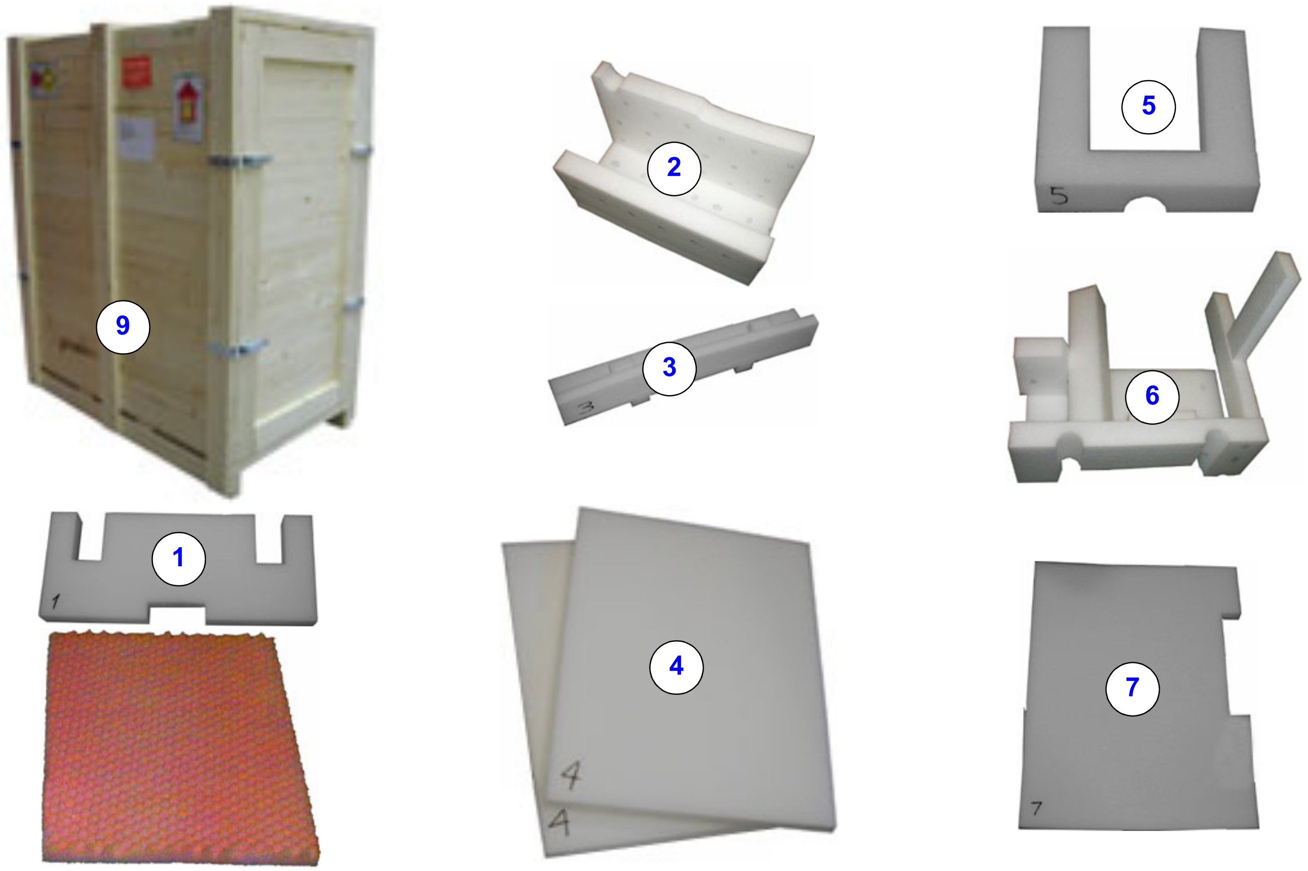

Figure 9-38 Packing Material (current versions) - LCD

Table 9-99 Packing Material for Reshipment of Vivid 7 with LCD

ITEM	DESCRIPTION	PART NUMBER	COMMENTS
1	Rear Stop Bumper	-	**NOTE 1:** **The Shelf Reinforcement (Item #4) may look slightly different, depending on Vivid 7/Vivid 7 PRO model needs.** **NOTE 2:** **Transportation Box used for China is slightly different.** **Re-shipping Unit:** Re-use the original Transportation Box and other packing materials used for shipment
2	Front Stop Bumper	-	
3	Front Panel Reinforcement	-	
4	Shelf Reinforcement	-	
5	Wedge	-	
6	Monitor Reinforcement	-	
7	Plate	-	
8	Pink plate	-	
9	Transportation Box	-	
	Plastic Foil	-	To wrap around the unit

Section 9-34
Packing Parts for Reshipment - Vivid 7 with CRT

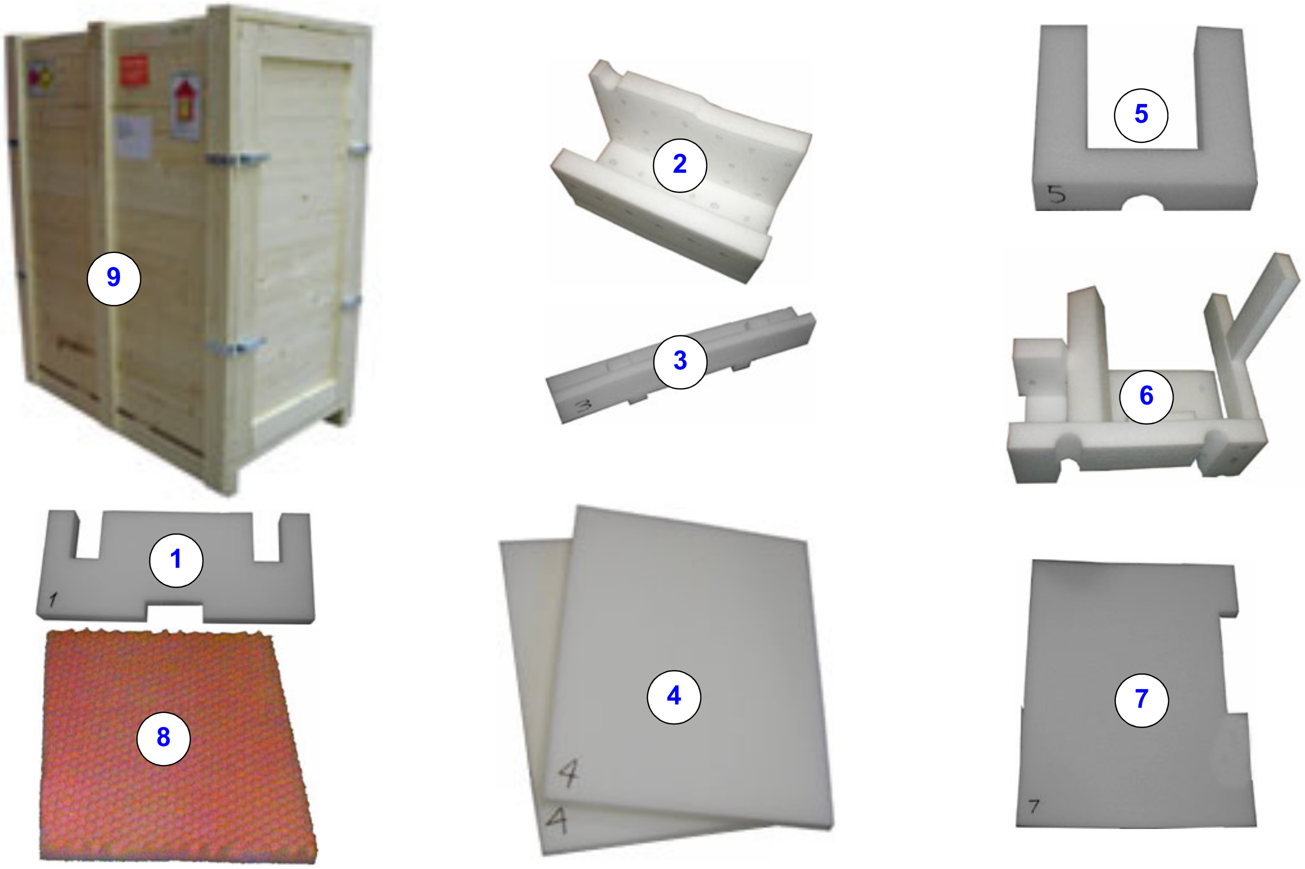

Figure 9-39 Packing Material (current versions) - CRT

Table 9-100 Packing Material for Reshipment of Vivid 7 with CRT

ITEM	DESCRIPTION	PART NUMBER	COMMENTS
1	Rear Stop Bumper	-	**NOTE 1:** **The Shelf Reinforcement (Item #4) may look slightly different, depending on Vivid 7/Vivid 7 PRO model needs.** **NOTE 2:** **Transportation Box used for China is slightly different.** **Re-shipping Unit:** Re-use the original Transportation Box and other packing materials used for shipment
2	Front Stop Bumper	-	
3	Front Panel Reinforcement	-	
4	Shelf Reinforcement	-	
5	Wedge	-	
6	Monitor Reinforcement	-	
7	Plate	-	
8	Pink plate	-	
9	Transportation Box	-	
	Plastic Foil	-	To wrap around the unit

Section 9-34 Packing Parts for Reshipment - Vivid 7 with CRT (cont'd)

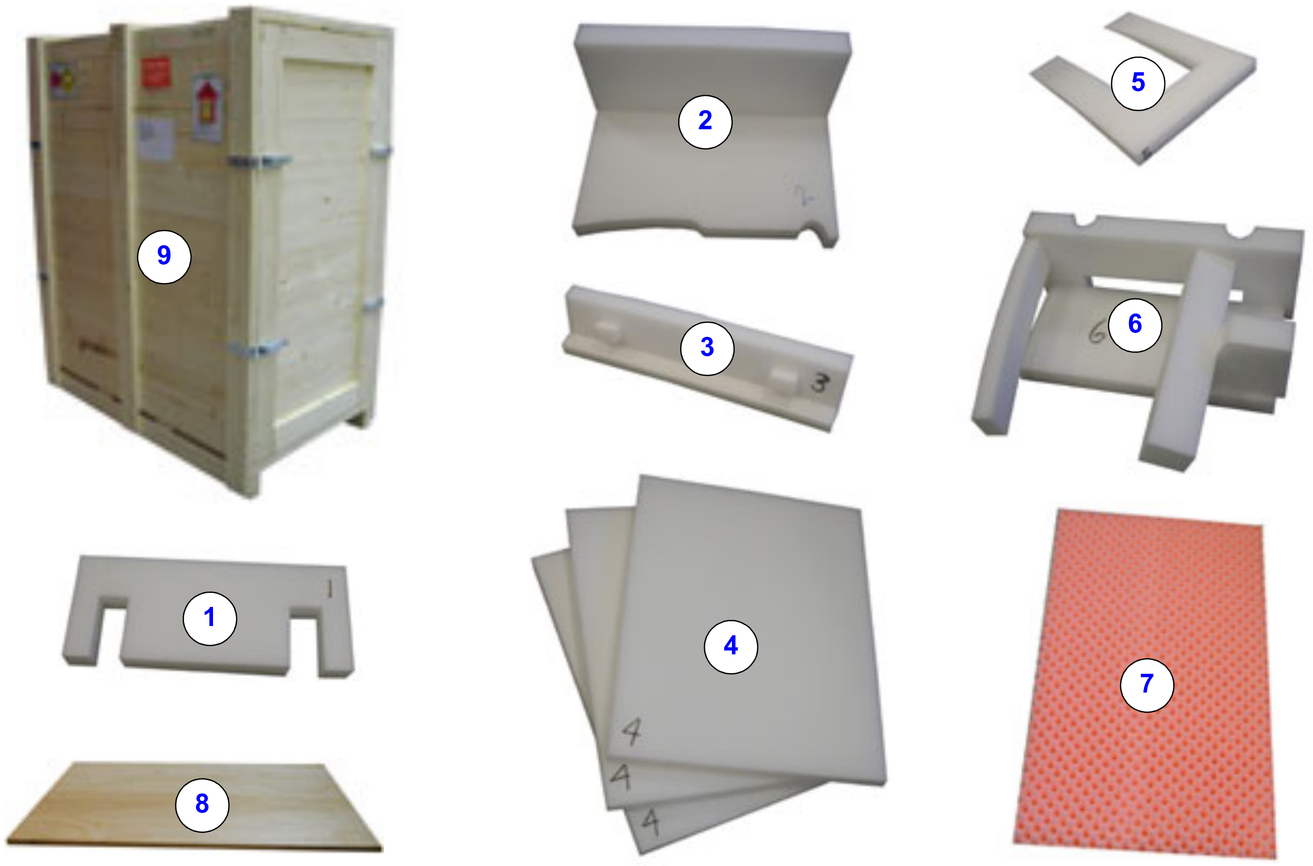

Figure 9-40 Packing Material (previous versions) w/CRT

Table 9-101 Packing Material for Vivid 7 Reshipment (previous versions) w/CRT

ITEM	DESCRIPTION	PART NUMBER	COMMENTS
1	Rear Stop Bumper	N/A	**Re-shipping:** Re-use the original wooden box and other packing materials used for shipment
2	Front Stop Bumper	N/A	
3	Front Panel Reinforcement	N/A	
4	Shelf Reinforcement	N/A	
5	Wedge	N/A	
6	Monitor Reinforcement	N/A	
7	Pink plate	N/A	
8	Wooden Shelf	N/A	
9	Wooden box	N/A	
	Plastic Foil	N/A	To wrap around the unit

Chapter 10
Care & Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

It has been determined by engineering that your Vivid 7 system does not have any high wear components that fail with use, therefore no Periodic Maintenance inspections are mandatory. Some Customers Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

Exception: One inspection per year in USA.

10-1-2 Purpose of Chapter 10

This chapter describes **Care & Maintenance** on the scanner and peripherals. These procedures are intended to **maintain the quality** of the ultrasound **systems performance**. Read this chapter completely and familiarize yourself with the procedures before performing a task.

10-1-3 Contents in Chapter 10

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why do Maintenance	10-2
10-3	Maintenance Task Schedule	10-3
10-4	Tools Required	10-5
10-5	System Maintenance	10-6
10-6	Using a Phantom	10-12
10-7	Electrical Safety Tests	10-12
10-8	When There's Too Much Leakage Current...	10-24
	Ultrasound Inspection Certificate	10-29

10-1-4 Important Warnings

⚠ CAUTION **Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/connecting cables.**

⚠ DANGER **THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION, AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.**

⚠ CAUTION **Do not pull out or insert circuit boards while power is ON.**

⚠ CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

Section 10-2
Why do Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of periodic and corrective maintenance. The Ultrasound Inspection Certificate (provided on page 25) provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

A copy of the Ultrasound Inspection Certificate should be kept in the same room or near the scanner.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer’s responsibility to have a quality assurance program in place for each scanner. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Please contact us for coverage and/or price for service.

Section 10-3
Maintenance Task Schedule

10-3-1 How often should maintenance tasks be performed?

The Customer Care Schedule (provided on page 10-3) specifies how often your Vivid 7 should be serviced and outlines items requiring special attention.

NOTE: *It is the customer's responsibility to ensure the Vivid 7 care & maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.*

Your GE Service Representative has an in-depth knowledge of your Vivid 7 ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care & Maintenance Task Schedule assumes that you use your Vivid 7 for an average patient load (10-12 per day) and not use it as a primary mobile unit which is transported between diagnostic facilities.

NOTE: *If conditions exist which exceed typical usage and patient load, then it is recommended to increase the periodic maintenance frequencies.*

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Table 10-2 Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Annually	Notes
Clean Probes	●*				* or before each use
Clean Probe Holders	●				
Clean Air Filter		●			more frequently depending on your environment
Inspect AC Mains Cable			●		Mobile Unit Check Weekly
Inspect Cables and Connectors			●		
Clean Console			●		
Clean Monitor and Touch Panel			●		
Inspect Wheels, Casters, brakes and Swivel Locks			●		Mobile Unit Check Daily
Check Operator Panel Movement			●		Mobile Unit Check Daily
Console Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program
Peripheral Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program
Surface Probe Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program

Table 10-2 Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Annually	Notes
Endocavity Probe Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program
Transesphongeal Probe Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program
Surgical Probe Leakage Current Checks				●	also after corrective maintenance or as required by your facilities QA program
Functional Checks				●	also after corrective maintenance or as required by your facilities QA program

Section 10-4
Tools Required

10-4-1 Special Tools, Supplies and Equipment

10-4-1-1 Specific Requirements for Periodic Maintenance

Table 10-3 Overview of Requirements for Periodic Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Air Filter	FB307903	Air intake. (See Section 9-9 "Plastic Parts, External Covers and Bumpers, Left, Right and Rear" on page 9-20).
Safety Analyzer	46–285652G1	DALE 600 KIT (or equivalent) for electrical tests
SVHS VCR Cassette	E7010GG E7010GF	60 minute 120 minute
SVHS VCR Head Cleaner		See VCR user manual for requirements
5.25” MOD MEDIA	2277190	Blank 2.3 M disk Blank 5.2 M disk
5.25” MOD Disk Cleaning Kit	066E0674	SONY MOA-D51
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS
CD-R media/DVD-R media,		As used by the Vivid 7 (Not all Vivid 7 support DVD)
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		
Cut/Chemical Resistant Gloves		
Ergonomic kneel pad	5140706	

Section 10-5
System Maintenance

10-5-1 Preliminary Checks

The preliminary checks take about 15 minutes to perform. Refer to the system user documentation whenever necessary.

Table 10-4 System Preliminary Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the top of the Ultrasound Inspection Certificate, see page 10-25. Note all probes and system options.
3	Power up	Turn the system power on and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor.
6	Presets	Backup all customer presets on an empty and formatted MO Disk (prefered) or to an empty CD-R disk.

10-5-2 Functional Checks (See Also Chapter 4)

The functional checks take about 60 minutes to perform. Refer to the system user documentation whenever necessary.

10-5-2-1 System Checks

Table 10-5 System Functional Checks

Check	Step	Description
	2D-Mode (B-Mode)	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic system controls that affect this mode of operation.
	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic system controls that affect this mode of operation.
	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
	*Applicable Software Options	Verify the basic operation of all optional modes such as Multi-Image, 3D, Contrast, Harmonics, Cine, Stress Echo,... etc. Check the basic system controls that affect each options operation.
	System Diagnostic	Perform the Automatic Tests, see section Section 7-8 on page 7-63, to verify that all boards function according to specifications.
	Operator Panel Test	Perform the Operator Panel Test Procedure, see section 7-7-3-1 on page 7-57, to verify that all keyboard controls are OK. This is performed by the internal PC (Back-End processor) which does a normal keyboard run through.
	Monitor	Verify basic Monitor display functions.

NOTE: ** Some software may be considered standard depending upon system model configuration.*

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted.

Table 10-6 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	DVR/VCR	Verify record/playback capabilities of the unit: Clean heads (VCR ONLY) and covers if necessary.
2	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5	InSite/iLinq	Verify that InSite is functioning properly. Ensure two-way remote communications. (Warranty & Contract Customers only)
6	Footswitch	Verify that the footswitch is functioning as programed. Clean as necessary.
7	ECG	Verify basic operation with customer

10-5-3 Input Power

10-5-3-1 Mains Cable Inspection

Table 10-7 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kinds.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

10-5-4 Cleaning

10-5-4-1 General Cleaning

Table 10-8 General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders. (they may need to be soaked to remove excess gel).
3	Op Panel	Only use the following cleaners on the Vivid 7 Operator Panel: • Palmolive Dishwashing Liquid (manufactured by Colgate-Palmolive) • Sani Wipes (manufactured by Microgen Inc.) • Tspray 2 (manufactured by Pharmaceutical Innovations, Inc.) DO NOT use original formula Tspray (Tspray 1) on the Operator Panel. Only Tspray 2 is acceptable. *NOTE: Since various lotions can have a long term negative impact on the operator panel, hands should be clean and free of lotion.*
4	CRT	To clean the monitor face: • Use a soft, folded cloth. Gently wipe the monitor face. • Do NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methyl Alcohol or Methyl Ethyl Ketone) on monitors with the filter (anti-glare shield). Hard rubbing will also damage the filter. • When cleaning the monitor, make sure not to scratch the monitor.
5	LCD	Never use thinner, benzene, alcohol (ethanol, methanol, or isopropyl alcohol), abrasive cleaners, or other strong solvents, as these may cause damage to the cabinet or LCD panel. DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel. To clean LCD panel: • The LCD surface can be cleaned with a soft cloth, such as cotton or lens paper. • If necessary, stubborn stains can be removed by moistening part of a cloth with water to enhance its cleaning power.

10-5-4-2 Air Filter Cleaning

Table 10-9 Air Filter Cleaning - frequency varies with your environment

Step	Item	Description
1	Remove Filter Cover	Refer to Section 8-5 "Air Filter Replacement Procedure" on page 8-8 for air filter location and removal instructions
2	Clean Filter	The filters can be cleaned in sprinkling water, or they can be dusted with a vacuum cleaner. If the filter is metal wash and/or vacuum. If the filter is fiber or plastic, vacuum or replace.
3	Install Filter	Install the clean filter.

NOTE: *For your convenience or if the air filter is too dirty, replacement filters are available. Refer to Chapter 9 for the air filter replacement part number.*

10-5-5 Physical Inspection

Table 10-10 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. See Section 1-5 "Labels Locations" on page 1-20.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Operator Panel	Inspect keyboard and Operator Panel. Note any damaged or missing items.
4	Operator Panel Movement	Verify ease of Operator Panel (Operator I/O Panel) movement in all acceptable directions. Ensure that it latches in position as required.
5	Wheels & Brakes	Check all wheels and casters for wear and verify operation of foot brake, to stop the unit from moving, and release mechanism. Check all wheel locks and wheel swivel locks for proper operation.
6	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs. Also check the wires connecting the side-fan on the BEP cover to the 4-PIN to make sure the wires are not pinched or damaged.
7	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
8	External I/O	Check all connectors for damage and verify that the labeling is good.
9	Op Panel Lights	Check for proper operation of all operator panel and TCG lights.
10	Monitor Light	Check for proper operation of any monitor lights, if available.

10-5-6 Optional Diagnostic Checks

Optionally you can access the diagnostic software as described in Chapters 5 or 7. View the error logs and run desired diagnostics.

10-5-6-1 View the Logs

1.) Review the system error log for any problems.
2.) Check the temperature log to see if there are any trends that could cause problems in the future.

10-5-7 Probe Maintenance

10-5-7-1 Probe Related Checks

Table 10-11 Probe Related Checks

Step	Item	Description
1	Probe Holder	Clean probe holders. (they may need to be soaked to remove excess gel).
2	Probes	Thoroughly check the system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins

10-5-7-2 Basic Probe Care

The system user manuals and various probe handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

Ultrasound probes can be easily damaged by improper handling. See the User Manual and probe care cards for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and system sockets before plugging in a probe.

TEE and Interoperative probes often have special considerations and individual probe user manuals. For TEE and Interoperative probes also refer to their separate user manuals.

10-5-7-3 Basic Probe Cleaning

Refer to the User's Manual for details on probe cleaning.

⚠ **WARNING** ***To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.***

⚠ **CAUTION** **Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty. DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe. Follow care instructions that came with the probe.**

⚠ **CAUTION** **Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.**

Section 10-6
Using a Phantom

See section 4 for information on using a phantom (4-3-5 "Performance Tests" on page 4-31) and quality assurance tests.

Section 10-7
Electrical Safety Tests

10-7-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the NFPA 99 (For USA) and IEC 60601-1 documents.

WARNING ***THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE SAFETY INSPECTIONS MENTIONED ABOVE.***

CAUTION **To avoid electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The unit under test must not be contacted by users or patients while performing these tests.**

CAUTION **Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.**

Test the system, peripherals and probes for leakage current. Excessive leakage current can cause injury or death in sensitive patients. High leakage current can also indicate degradation of insulation and a potential for electrical failure. Do not use probes or equipment having excessive leakage current.

To minimize the risk that a probe may shock someone the customer should:

- Not use a probe that is cracked or damaged in any way
- Check probe leakage current:
  - * Based on your facilities QA program for surface probes
  - * Based on your facilities QA program for endocavitary probes
  - * Whenever probe damage is suspected

10-7-2 GEHC Leakage Current Limits

The following limits are summarized for NFPA 99/UL2601-1/UL60601-1 (for USA) and IEC 60601-1 Medical Equipment Safety Standards. These limits are GEHC standards and in some cases are lower than the above standards listed.

Table 10-12 Chassis Leakage Current Limits—Accessible Metal Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-13 Type BF Patient Leakage Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

Table 10-14 Type CF Patient Leakage Limits - Surgical Probes and ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.05 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 mA

NOTE: **Mains Applied refers to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.*

The following tests are performed at the factory and should be performed at the site. These tests are: grounding continuity, chassis leakage current, probe leakage current, and ECG leakage current. All measurements are made with an electrical safety analyzer.

10-7-3 Outlet Test - Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

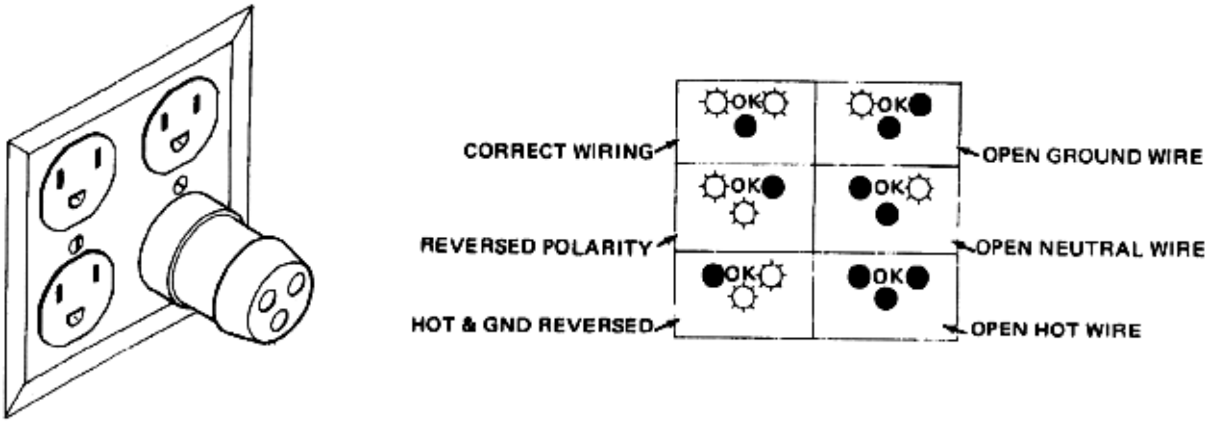
CORRECT WIRING
REVERSED POLARITY
HOT & GND REVERSED
OPEN GROUND WIRE
OPEN NEUTRAL WIRE
OPEN HOT WIRE
OK
OK
OK
OK
OK
OK

Figure 10-1 Typical Alternate Outlet Tester

NOTE: No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

10-7-4 Grounding Continuity

⚠ **CAUTION** **Electric Shock Hazard. The patient must not be contacted to the equipment during this test**

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC 601-1.1.

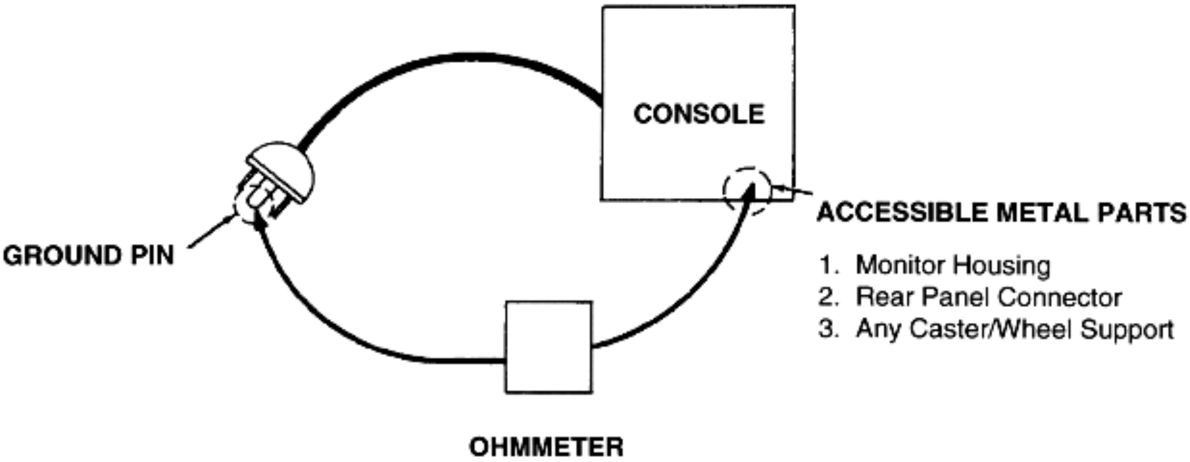
CONSOLE
ACCESSIBLE METAL PARTS
1. Monitor Housing
2. Rear Panel Connector
3. Any Caster/Wheel Support
GROUND PIN
OHMMETER

Figure 10-2 Ground Continuity Test

10-7-4-1 Meter Procedure

Follow these steps to test the ground wire resistance.

1.) Turn the Vivid 7 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the Vivid 7 unit.
4.) Set the meter's “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the ground wire resistance.

10-7-5 Chassis Leakage Current Test

10-7-5-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station if the ground wire should break. The test verifies the isolation of the power line from the chassis. The meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit On and Off, with the power line polarity Normal and Reversed. Record the highest reading.

CAUTION **Electric Shock Hazard. When the meter's ground switch is OPEN, don't touch the unit!**

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged.**

10-7-5-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

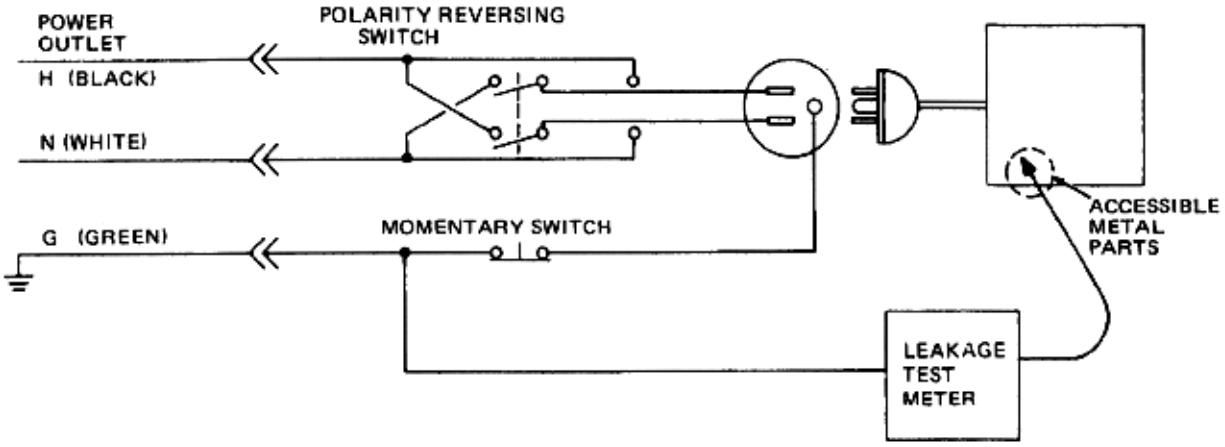

Figure 10-3 Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-12 "Chassis Leakage Current Limits—Accessible Metal Surfaces" on page 10-13.

7.) Follow the test conditions described for respective test points shown in Table 10-15 "Chassis Leakage Current Test Condition" on page 10-17.

10-7-5-2 Generic Procedure (cont'd)

.

Table 10-15 Chassis Leakage Current Test Condition

TEST	CONDITION
1	Mounting screw for probe receptacle
2	Wheel support
3	Mounting screw for CRT housing
4	Mounting screw for peripheral plugged into unit
5	Mounting screw for other peripheral powered by unit

8.) Keep a record of the results with other hard copies of PM data kept on site.

10-7-5-3 Data Sheet for Chassis Source Leakage Current

The test passes when all readings measure less than the value shown in Table 10-12. Record all data on the PM Inspection Certificate.

Table 10-16 Typical Data Sheet for Chassis Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector	Test 2 Wheel	Test 3 CRT	Optional Test 4	Optional Test 5
Enter Name of tested peripheral here:							
ON	NORM	OPEN					
ON	NORM	CLOSED					
ON	REV	OPEN					
ON	REV	CLOSED					
OFF	NORM	OPEN					
OFF	NORM	CLOSED					
OFF	REV	OPEN					
OFF	REV	CLOSED					

10-7-6 Isolated Patient Lead (Source) Leakage–Lead to Ground

10-7-6-1 Definition

This test measures the current which would flow to ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface. Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the ultrasound console Off and On. For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

⚠ **CAUTION** **Equipment damage possibility. Never switch the Polarity when the unit is powered ON. Be sure to turn the unit power OFF before switching the polarity using the POLARITY switch. Otherwise, the unit may be damaged.**

10-7-6-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the operating controls such as the lead switch should be operated to find the worst case condition.

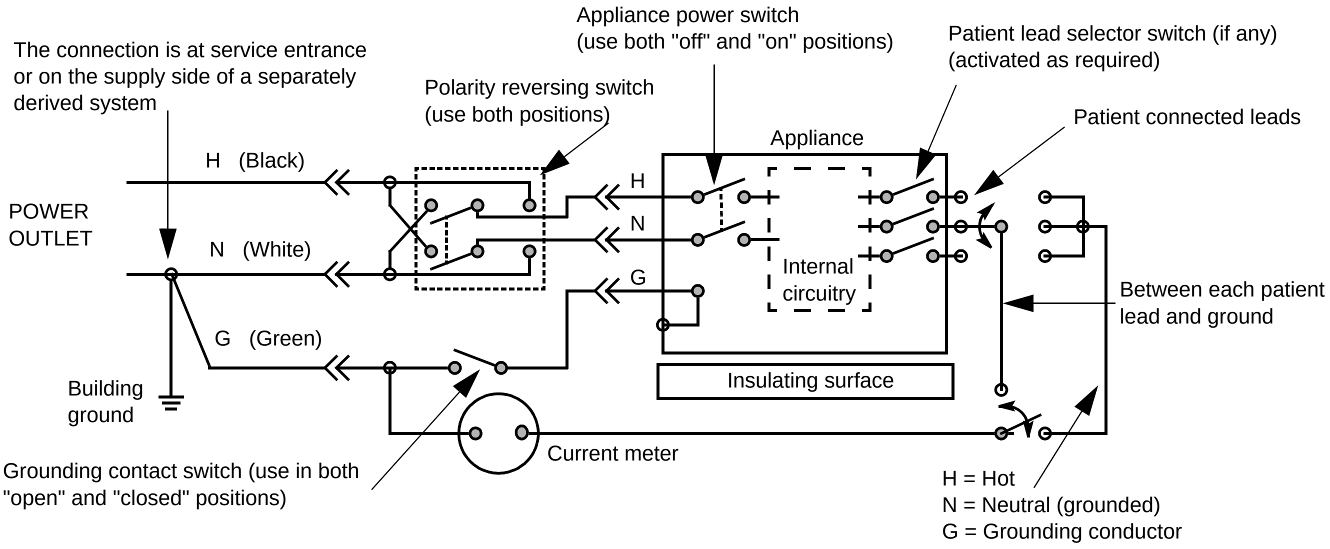
Appliance power switch
(use both "off" and "on" positions)
Patient lead selector switch (if any)
(activated as required)
The connection is at service entrance
or on the supply side of a separately
derived system
Polarity reversing switch
(use both positions)
Patient connected leads
Appliance
H (Black)
POWER
OUTLET
N (White)
H
N
G
G (Green)
Internal
circuitry
Between each patient
lead and ground
Building
ground
Insulating surface
Grounding contact switch (use in both
"open" and "closed" positions)
Current meter
H = Hot
N = Neutral (grounded)
G = Grounding conductor

Figure 10-4 Test Circuit for Measuring Non-Isolated Patient Leads

Table 10-17 Testing Power Conditions

ECG Power	Meter’s Polarity Switch	Meter’s Neutral Switch
ON	NORM	CLOSED
ON	NORM	OPEN
ON	REVERSE	CLOSED
ON	REVERSE	OPEN
OFF	NORM	CLOSED
OFF	NORM	OPEN
OFF	REVERSE	CLOSED
OFF	REVERSE	OPEN

10-7-7 Isolated Patient Lead (Source) Leakage–Lead to Lead

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter’s function selector to the LEAD-LEAD position. Select and test each of the five ECG lead positions (except ALL) on the LEAD selector, testing each to the power condition combinations found in the table. Record the highest leakage current measured.

10-7-8 Isolated Patient Lead (Sink) Leakage-Isolation Test

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter's function selector to the LEAD-ISO. Select the ALL position on the lead selector. Depress the rocker switch to ISO TEST to test lead isolation.

⚠ CAUTION **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.**

NOTE: It is not necessary to test each lead individually or power condition combinations as required in previous tests.

10-7-8-1 Data Sheet for ECG Leakage Current

The test passes when all readings measure less than the value shown in the table below. Record all data on the PM Inspection Certificate.

Table 10-18 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead to Ground Leakage Current Test and Patient Lead to Lead Leakage Current Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 10-19 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-20 Typical Data Sheet for ECG Leakage Current

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-7-9 Probe Leakage Current Test

10-7-9-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

10-7-9-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the probe must be active to find the worst case condition.

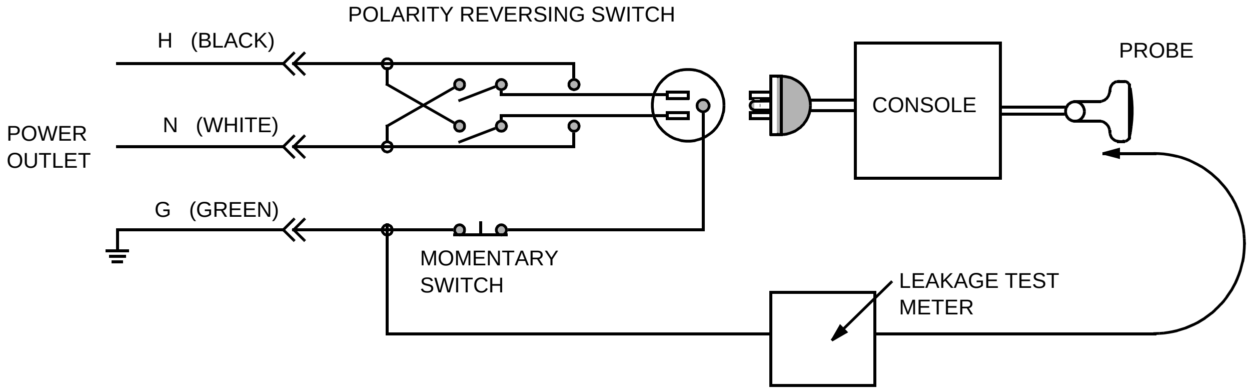
POLARITY REVERSING SWITCH
H (BLACK)
PROBE
POWER OUTLET
N (WHITE)
CONSOLE
G (GREEN)
MOMENTARY SWITCH
LEAKAGE TEST METER

Figure 10-5 Set Up for Probe Leakage Current

NOTE: Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

10-7-9-3 No Meter Probe Adapter Procedure

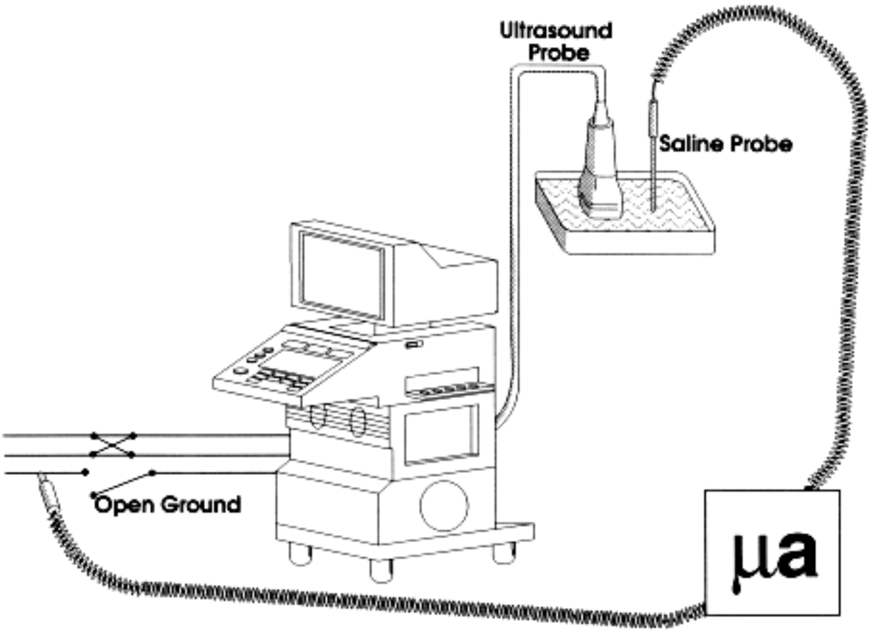

Figure 10-6 No Meter Probe Adapter Procedure

Follow these steps to test each transducer for leakage current.

1.) Turn the Vivid 7 unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Plug the external probe into the meter's “EXTERNAL” connector.
4.) Set the meter's “FUNCTION” switch to EXTERNAL position.
5.) Connect the probe for test with the connector of the console.
6.) Add the saline probe and the imaging area of the probe into the saline bath.
7.) Have unit power ON for the first part; turn it OFF for the second half.
8.) Depress the ISO TEST rocker switch and record the highest current reading.
9.) Follow the test conditions described in Table 10-21 "Typical Data Sheet For Transducer Source Leakage Current" on page 10-23 for every transducer.
10.) Keep a record of the results with other hand copies of PM data.

10-7-9-4 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in Table 10-13 and Table 10-14. Record all data on the PM Inspection Certificate.

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged**

.

Table 10-21 Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NUETRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

Section 10-8
When There's Too Much Leakage Current...

CHASSIS FAILS

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

PROBE FAILS

Test the probe in another connector to isolate if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

PERIPHERAL FAILS

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

STILL FAILS

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

NEW UNIT

If the leakage current measurement tests fail on a new unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

ECG FAILS

Inspect cables for damage or poor connections

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
Applicable Hardware Options	
Operator Panel	
Monitor	
Touch Panel	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE Approved Peripherals (VCR, DVR, CD/DVD, MOD, Printers)		

COMMENTS:

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Probe				
Chassis Source Leakage Current - Wheel				
Chassis Source Leakage Current - CRT				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1 Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2 Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3 Ground Continuity				

PROBES

Probe Number (from previous page)	Max Value Allowed	Max Value Measured	OK?	Comments
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by: ____

Section 10-9
Site Log

Table 10-22 Site Log

DATE	SERVICE PERSON	PROBLEM	COMMENTS

Table 10-22 Site Log (cont'd)

DATE	SERVICE PERSON	PROBLEM	COMMENTS

Table 10-22 Site Log (cont'd)

DATE	SERVICE PERSON	PROBLEM	COMMENTS

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GE Vingmed Ultrasound AS
P.O.Box: 141
N-3191 HORTEN
NORWAY
www.gehealthcare.com